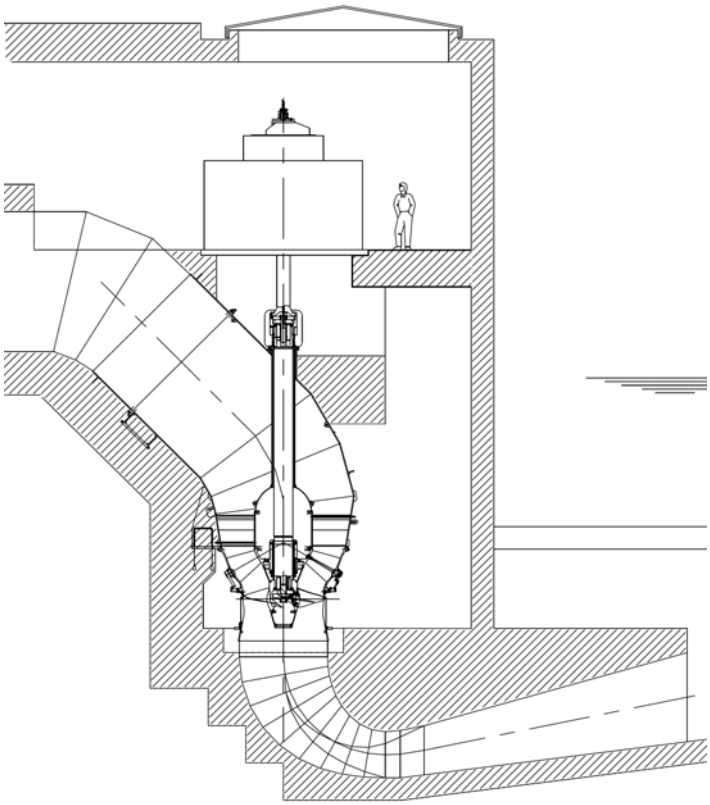
EXHIBIT

A

VA TECH HYDRO Canada, Inc.

ROCHESTER STATION 2 HYDROELECTRIC PROJECT

PROPOSAL FOR TURBINE/GENERATOR
AND ACCESSORY EQUIPMENT



SUBMITTED TO:
Rochester Gas & Electric Corporation
Rochester, NY

VATECH HYDRO ANDRITZ

VATECH HYDRO ANDRITZ

October 26, 2007

Rochester Gas & Electric Corporation
89 East Avenue
Rochester, NY 14649

Attention: Mr. Robert DiBaudo

Subject: Proposal for Supply of Hydraulic Turbine-Generator Equipment
Rochester Station 2 Hydroelectric Project
Hatch Acres Technical Specification H-325921.40.01

Dear Mr. DiBaudo:

In response to your invitation, we are pleased to submit our proposal for the supply of one hydraulic turbine generator unit including accessory equipment for the Rochester Station 2 Project. The scope proposed covers the design, manufacture, and delivery of one vertical Kaplan type turbine, synchronous generator, hydraulic pressure system and controls system. The selection of the turbine size, speed, setting and general arrangement was based upon the site net head, discharge data, and evaluation criteria included in your Technical Specification.

The unit arrangement includes a direct connect synchronous type generator mounted above the turbine intake elbow. The turbine design is proposed with both adjustable blades and wicket gates to permit operation over a wide range of flows at high efficiencies.

The proposed equipment will be designed, manufactured and tested in accordance with the usual methods of VA TECH HYDRO Canada, Inc. and its proposed subcontractors. Coordination and design of the equipment components into a complete hydroelectric turbine/generator system, in addition to contract administration and project management functions, will be performed by VA TECH HYDRO Canada, Inc.'s facilities in Stoney Creek, Ontario. Equipment drawings, information and manuals will be prepared and submitted in accordance with VA TECH HYDRO Canada, Inc.'s usual format. Such information including installation instructions and start-up/commissioning procedures will be in English and include dimensions expressed in both metric and U.S. Customary Units.

Scope, design details and performance characteristics and guarantees of the proposed equipment will be as described in this proposal. We believe that this proposal satisfies the requirements of the project with high quality equipment of well-proven design.

The turbine equipment is proposed to be designed by VA TECH Escher Wyss in Ravensburg, Germany. VA TECH HYDRO will make use of its global sourcing network of production facilities to source the manufacturing of the turbine equipment. Turbine equipment materials used are defined in accordance with the applicable European standards and will be equivalent or superior to the materials standards outlined in the customer specification. Likewise, welded parts are designed, fabricated, inspected and tested in accordance with the European Standards.

The proposed generator supplier is Hyundai Ideal Electric Co. of Mansfield, Ohio, a generator manufacturer well experienced in providing high quality hydroturbine driven generator equipment of the size and type proposed herein. Phoenix Power Control, Inc. of Monroe, WA is proposed to design and supply the controls systems.

It is specifically noted that this offering does not include on-site installation, assembly, civil/concrete/rebar detail design or construction work. Field service representatives from VA TECH HYDRO Canada, Inc. will be available during installation, start-up/commissioning and testing as quoted herein.

Our proposal is valid for 90 days and consists of this cover letter and the following attached documents:

SECTION 1	Price Summary
SECTION 2	Technical and Performance Data
SECTION 3	Equipment Description
SECTION 4	Guarantees
SECTION 5	Applicable Schedule
SECTION 6	Shop Inspection and Testing
SECTION 7	Protective Coatings
SECTION 8	Erection Advisory Services
SECTION 9	Commercial Terms and Conditions
SECTION 10	Exhibits:

Performance Curves — Experience Lists
Proposal Drawings — Sales Literature

We encourage you to review the descriptions of the proposed equipment and we request further discussions with you to ensure that your performance and scope requirements are satisfied. Should you require additional information or wish to discuss any aspects of this offering please contact us at:

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Regards,

VA TECH HYDRO Canada, Inc.

For Mark Barandy

cc Mr. K. Pomeroy; VA TECH HYDRO Canada, Inc.
Mr. T. Taylor; VA TECH HYDRO Canada, Inc.
Mr. P. Duflon; VA TECH Bouvier Hydro, S.A.

SECTION 1 - PRICE SUMMARY

ITEM 1 Quantity 1 Vertical Kaplan Turbine/Generator Unit

Description: Kaplan Turbine, Hydraulic Pressure Unit (HPU), Synchronous Generator and Controls. See Proposal Section 3.

Total Price: Dollars US$ **5,291,683**
(US Dollar Five Million two hundred ninty one thousand, six hundred and eighty three only)

OPTION ITEM 1 Field Service Representation During Installation/Start-up (limited to 17 man weeks), see proposal Section 8

Total Price: Dollars US$ **180,705**
(US Dollar One Hundred Eighty Thousand, Seven Hundred and Five only)

See Rate Sheet included in Proposal Section 8.

SECTION 2 - TECHNICAL AND PERFORMANCE DATA

Turbine

Type	-	Vertical Axial Intake Kaplan Turbine
Runner Diameter	-	1950 mm
Intake Type	-	Axial, Elbow Intake (45° from vertical
Inlet Elbow Diameter	-	3315 mm (10.9 ft)
Speed	-	327 rpm
Rated Turbine Output (at 25.9m; 85 ft Net Head)	-	6,637 KW (28.3 m^3/s; 1000 cfs)
Runner Centerline Setting	-	4.44m (14.6 ft) below T.W. elev (393.2')
Runner Centerline Elevation	-	115.4m; (378.6')
Number of Runner Blades	-	6
Runner Blade Material	-	Stainless Steel
Number of Wicket Gates	-	12
Wicket Gate Material	-	Cast Steel
Draft Tube Type	-	Elbow
Draft Tube Type	-	Elbow (circular to rectangular transition)
Runner Cavitation Damage Guarantee	-	No more than 2.98 kg per 8000 hr operation (See Proposal Section 4)
Runner Hub Ratio	-	45%
Maximum Runaway Speed	-	850 rpm (at 27.34m head)
Normal Hydraulic Thrust	-	669 kN (at 28.5m head)
Maximum Hydraulic Thrust	-	828 kN (at 28.5m head)
Runner Inertia	-	Approx 533 kg-m^2

Turbine (continued)

Turbine Bearing Type - Water Lubricated Sleeve

Turbine Performance at 25.9m; 85 ft Net Head:

Turbine Output (KW)	Efficiency (%)	Discharge (m^3/s)	
6637	92.4	28.30	(1000 cfs spec limit)
6031	93.2	25.47	
5373	93.4	22.64	
4696	93.3	19.81	
4003	92.8	16.98	
3300	91.8	14.15	
2585	89.9	11.32	

Turbine Maximum Output Capability with defined tailwater elevations and without turbine discharge limit of 1000 cfs:

Net Hd (ft)	Net Hd (m)	TW El (ft)	TW El (m)	Max Q (cfs)	Max Q (m3/s)	Turbine Eff (%)	Turbine KW
90	27.43	393	119.8	1013	28.7	92.5	7217
90	27.43	396	120.7	1045	29.6	92.0	7403
85	25.91	393	119.8	1017	28.8	92.2	6818
85	25.91	396	120.7	1045	29.6	91.7	6969
80	24.38	393	119.8	1010	28.6	91.8	6344
80	24.38	396	120.7	1031	29.2	91.5	6456

Equipment provided as following Major Subassemblies:

- Elbow Intake (Turbine Housing) Sections
- Runner Assembly
- Shaft, Bearing, Bulb
- Distributor (Wicket Gate Assembly)
- Draft Tube Liner and Discharge Ring
- Miscellaneous Parts

Estimated Weights:

Runner - 2830 kg
Total Turbine Weight - Approx 38,000 to 40,000 kg

Synchronous Generator

Manufacturer	-	Hyundai Ideal Electric Co.
Type	-	Vertical Synchronous
Speed	-	327 rpm
100% Nominal Rated Output	-	7,000 kVA, 6,300 KW
Voltage	-	11.5 kV
Power Factor	-	0.90
Insulation Class	-	F
Temperature Rise	-	80°C (Stator by RTD) 80°C (Field by Resistance)
Short Circuit Ratio	-	1.259

Reactances (per unit at KVA rating)	Saturated	Unsaturated
Direct Axis Synchronous	0.794	0.961
Direct Axis Transient	0.284	0.305
Direct Axis Subtransient	0.197	0.208
Quadrature Axis Synchronous	0.618	0.618
Quadrature Axis Transient	0.618	0.618
Quadrature Axis Subtransient	0.259	0.273
Negative Sequence	0.233	0.240
Zero Sequence	0.123	0.129

Inertia Constant	-	1.146 kW-sec/kVA
Exciter Type	-	Brushless
Enclosure Type	-	Open dripproof
Generator Rotor WR^2	-	324,200 lb-ft^2

Performance at 0.90 power factor:

% of Rated Output	Efficiency (%)
100%	96.4
75%	96.1
50%	95.3
25%	92.2

Bearing Type	-	Sleeve Type, Oil Lubricated, Water Cooled

SECTION 3 - EQUIPMENT DESCRIPTION

Vertical Kaplan Turbine

General Unit Arrangement

The turbine arrangement proposed for the Rochester Station 2 project is a vertical axis, axial intake, Kaplan type unit. The unit is proposed to be provided with an elbow intake liner (turbine housing) for connection to the existing penstock and would discharge through an elbow draft tube in the existing discharge channel. The arrangement design has the generator mounted above the intake elbow on a new concrete structure.

Runner and Shaft

The turbine runner is of the adjustable blade propeller type with hub and blades made of stainless steel. The runner blades are carefully profiled for proper performance and are highly resistant to corrosion, cavitation and erosion. The hub is spherically shaped to minimize flow leakage between the blades and the hub at all operating blade angles. Seals are provided at the blade trunnions to prevent water from entering the hub. A hydraulic servomotor mechanism including links, levers and bushings is located within the hub for runner blade operation. A position transmitter is provided to indicate runner blade position. Self-lubricating, maintenance-free synthetic bushings are used throughout the runner assembly.

The turbine shaft is a steel tubular fabrication or of forged carbon steel. At the runner end, the shaft is designed with a conical geometry for fitting with the runner using a pressure oil injection method. The generator end of the shaft is prepared cylindrically for connection to the generator shaft using a friction coupling (Ringfeder or similar). The shaft is supported radially within the turbine bulb by the turbine guide bearing. A mechanical seal is located where the shaft passes through the elbow intake elbow. Stainless steel shaft sleeve are also provided where the guide bearing and the shaft seals are located. The shaft is surrounded by a steel protection tube going through the turbine housing and connected to the turbine bulb.

Intake Elbow (Turbine Housing)

The intake elbow is a carbon steel fabrication and is provided with a flange at its downstream end for connection to the outer gate barrel. The intake elbow includes stay vanes to support the bulb within the waterpassage and which also support the inner gate barrel and turbine bearing. The intake elbow is provided with a mandoor to permit access into the unit for inspection. A mechanical seal is located where the shaft passes through the elbow intake elbow. At the upstream end a flange is provided for connecting the intake elbow to the intake piping. The elbow is designed for concrete embedment.

Guide Bearing

The turbine guide bearing is a water lubricated sleeve type bearing. This bearing is supported within the turbine "bulb". Any filtered lubricating water needed for this bearing is to be provided by others. The turbine rotating assembly is supported axially at the upstream end by a thrust bearing and additional guide bearing included with the generator.

Vertical Kaplan Turbine (continued)

Discharge Ring

The turbine discharge ring is a welded carbon steel fabrication with a stainless steel section in the area of the runner periphery. The discharge ring is flanged on its upstream end for connection to the outer gate barrel. The downstream end is prepared for connection to the draft tube liner section through a dismantling joint. The discharge ring is suitably ribbed and is split for easy access to and removal of the runner. The interior surface of the ring is accurately machined in a spherical shape to minimize flow leakage between the runner blades and ring.

Inner and Outer Gate Barrels

The inner and outer gate barrels are of fabricated carbon steel. The outer gate barrel is flange connected to the elbow intake (turbine housing) at its upstream end and to the discharge ring at its downstream end. The inner gate barrel is mounted to the inner bulb supported by fixed vanes. The inner gate barrel also supports the turbine bearing. Wicket gate stem bushings are mounted in the gate barrels. The inner portion of the outer gate barrel and outer portion of the inner gate barrel are spherically machined to conform to the shape of the wicket gates.

Wicket Gate Assembly

The wicket gates are of cast steel and are supported by self lubricated, maintenance free bushings located in the inner and outer gate barrels. The gate shape and number will assure proper flow characteristics of water as it enters the runner. The gate axes are oriented conically to optimize unit efficiency. The gate mechanism consists of gate ring, link and lever system with spring link assemblies (on alternating gates) to protect the wicket gates from damage due to blockage. The gate links, levers, and operating ring are of fabricated or cast steel construction. A position transmitter is provided to indicate wicket gate position. The operating ring is a steel fabrication and is supported by maintenance free bushings mounted to the outer gate barrel. One double acting servomotor is provided for operation of the gate mechanism.

Draft Tube

The upstream portion of the draft tube is a steel fabricated liner, and provided with a joint for connection to the discharge ring. The liner is designed for embedment in concrete. The liner extends to where the cross section is rectangular; from there on the draft tube is formed in the concrete (by others) according to the waterpassage contours shown on VA TECH HYDRO submitted drawings. The draft tube is properly shaped and is functionally homologous to the model to ensure correct hydraulic performance. Because of unit size and shipping constraints, the draft tube liner may be sectionalized requiring some field welding (by others).

Vertical Kaplan Turbine (continued)

Oil Head

An oil head (oil rotating valve) is provided to permit pressurized hydraulic oil to pass from stationary hydraulic lines to the rotating blade servomotor. The oil head is mounted onto the generator shaft at the top of the generator. A position transmitter is provided to indicate full open and closed positions.

Turbine Materials

The turbine equipment is proposed to be designed by VA TECH HYDRO in Ravensburg, Germany. Turbine equipment materials used are defined in accordance with the applicable German and European Standards. Likewise, welded parts are designed, fabricated, inspected and tested in accordance with the German and European Standards. These collectively include:

- European Norms (EN)
- Deutsche Industrie Norm (DIN) (= German Industry Norm)
- Verband Deutscher Elektrotechniker (VDE) (= Association of German Electrical Engineers)
- International Electrotechnical Commission (IEC)
- Metric System

Parts / Subassembly	Material Specs	According to DIN 17007
Runner blades	GX5CrNi13-4	1.4313
Hub	GX5CrNi13-4	1.4313
Runner Cone (hood)	S235JRG2	1.0038
Outer & Inner Distributor Housing	S235JRG2	1.0038
Turbine Housing	S235JRG2	1.0038
Turbine Shaft	CK35N or S355J2+N	1.1181 / 1.0577
Discharge Ring	S235JRG2 with stainless steel section in runner area	1.0038
Draft tube liner	S235JRG2	1.0038
Wicket Gates	GS 20 Mn5V	1.1120

Above materials are subject to change. If above listed materials are not available similar or higher quality materials would be used.

Vertical Kaplan Turbine (continued)

Miscellaneous

- One complete set of any special tools for installation and maintenance are provided.
- Four pressure taps at the turbine inlet for net head measurement
- Winter- Kennedy Taps for relative flow measurement
- Four pressure taps (on piezometer plates) for installation at end of draft tube
- Vibration detector mounted near the turbine guide bearing
- RTD(s) for turbine guide bearing

Hydraulic Pressure Unit (HPU)

The hydraulic pressure unit (HPU) is an oil pressure and distribution system of sufficient capacity to operate the turbine runner blade and wicket gate servomotors as well as the unit brake. The HPU system is complete with motor/pumps, solenoid valves, protective switches and necessary filters and auxiliary components. The hydraulic power unit is designed to respond to electrical on/off, open/close signals supplied by the electrical control equipment (by others). The rates of blade opening/closing and wicket gate opening/closing are adjustable. Hydraulic lines between the turbine oil head/distributor servomotor and the HPU are not included in the proposed scope. Pressure storing bladder type accumulators are provided and sized to enable proper movement of the runner blades and wicket gates during a “loss of power” event. Due to the size and number of the accumulators required to satisfy the requirement, they may require wall mounting instead of mounted on the HPU assembly.

Vertical Synchronous Generator

The generator is proposed to be a Type SAVB vertical brushless synchronous generator as designed and manufactured by the Hyundai Ideal Electric Co and rated as follows:

7,000 KVA, 6,300 KW, 0.90 P.F., 327 RPM, 3 Phase, 60 Hertz, 11,500 Volts, WYE connected, six leads, 80° C temperature rise above a 40° C ambient, continuous duty, Class F insulation.

Electrical Features:

1. Damper windings, connected
2. Insulation system to be VPI-complete
3. Field suitable for excitation from brushless exciter
4. Capable of operating at rated kVA and rated temperature rise at altitudes of 3300 feet above sea level
5. Six leads for differential protection

Mechanical Features:

1. Thrust bearing capable of 150,400 lbs. continuous downthrust (669 kN)
    a. Bearing to be oil lubricated, water cooled
    b. Hydrostatic lift system
    c. Momentary downthrust capability – 186,100 lbs. (828 kN)
2. Guide bearing to be sleeve type, oil lubricated
3. One bearing(s) to be insulated to prevent shaft currents
4. Forged flanged shaft, with 800 mm free shaft length
5. Mechanical balance per NEMA Standard
6. Open Dripproof Enclosure, with mounting flange for Customer supplied air exhaust ductwork
7. Generator to be provided with air filters over air intake openings. Filters to be re-useable type
8. Unit to be capable of 850 RPM overspeed without mechanical injury
9. Generator rotor WR2 to be at least 324,200 lb-ft^2

Accessories:

1. Bearing temperature detectors, one per every other pad, RTD type, 100 ohm platinum
2. Low / High oil level switch, one per bearing sump, with alarm and trip contacts
3. Two grounding pads on frame to be located diagonally opposite of each other
4. Soleplates complete with shims, jackscrews, dowel pins and hold down bolts
5. Space heaters
6. Six stator temperature detectors, RTD type, 100 ohm platinum
7. Brushless exciter
8. Furnish and mount vibration sensors. Two per bearing located in X-Y plane
9. Mechanical overspeed switch
10. Furnish and mount tooth gear and two active speed pick-ups. Furnish Air Pax Tach Pac #3 speed switch for mounting by others
11. Air operated brakes, consisting of caliper and brake disc only
12. Furnish hydraulic cylinders for rotor jacking during maintenance only. Furnish hand-operated hydraulic pump unit.

Vertical Synchronous Generator (continued)

Main terminal box including:

1. Lightning arrestors
2. Surge capacitor
3. Oversize to accommodate stress cones furnished by others
4. Three CT's for differential protection
5. Three CT's for metering
6. Cross current CT
7. Two Series Boost CT's
8. One Power Isolating Transformer, fused type, stationary mounted
9. Two Potential transformers, stationary mounted, fused type
10. Series boost Reservoir Assembly, furnished loose

Neutral phase terminal box, including:

1. Three CT's for differential protection
2. Three CT's relaying
3. Neutral grounding transformer and secondary resistors, sized to limit primary ground fault current to 10 amps, time rating 10 sec.

Static voltage regulator system(s) furnished for mounting in controls cabinet, to include:

1. DECS 200 voltage regulator

Spare Parts

None proposed

Plant Control System

The Plant Control System is proposed to designed and manufactured by Phoenix Power Control, Inc. of Monroe, Washington and described as follows:

Item	Description	
1	**PROPOSED ENGINEERING SERVICES** ▪ Drawing and documentation submittals ▪ Arrangement drawings ▪ Single line drawing ▪ Three line drawings ▪ Schematic wiring diagrams ▪ Wiring diagrams ▪ Standard logic diagram ▪ Software design, development and programming for the proposed GE 90-30 and VersaMax series PLC ▪ Bill of Material (Device Summary) ▪ Operation & Maintenance Manuals ▪ Site testing and commissioning plan	
2	**Unit Control** ▪ Three vertical sections NEMA 12 Enclosure, each 36”Wx90”Hx36”D ▪ GE 90-30 series PLC with appropriate I/O modules wired to terminal strip ▪ Operator interface ▪ GE SR 489 multifunction protective relay including relay setting calculations ▪ Clifton Labs automatic synchronizer ▪ Synch check relay with dead bus option ▪ Multifunction digital panel meter ▪ Ethernet to fiber optic converters ▪ Electroswitch series 24 utility grade lock-out relays, or equal ▪ GE SB-1 utility grade switches, or equal ▪ Annunciator lamp box for alarm indication ▪ Manual control on front of switchboard panels ▪ Utility grade switchboard meters ▪ Laser printer ▪ Installation and wiring of DECS 200 style excitation system (supplied by generator contractor) ▪ Monitoring of RTD’s (supplied by turbine/generator contractor) ▪ Protective relays are “hard wired” to shutdown relay ▪ Unit automatic control modes managed by PLC	

Plant Control System (continued)

	Rackhouse and Central Avenue Remote Telemetry Units, each including: ▪ 20”W x 20”H x 8”D NEMA 4 wall mount enclosure ▪ GE VersaMax PLC with appropriate I/O modules wired to terminal strip ▪ Ethernet to fiber optic converter ▪ Heater with thermostat ▪ Two (2) Rackhouse and One (1) Central Avenue submersible level transducer(s) with 30 feet of cable	
	Current and Potential Transformers ▪ Four (4) ITI potential transformers, 11,500:120 ratio ▪ Twelve (12) ITI Current transformers, 500:5 ratio	
	Vibration Monitor -The vibration monitor and sensors (sensors to be installed by turbine contractor) listed on the attached bill of material is for estimating purposes only. Phoenix reserves the right to re-evaluate the estimated cost for the vibration monitor and sensors after turbine designs and components have been finalized	
	Spare Parts- A listing of recommended spare parts and components as listed on the attached bill of material is for estimating purposes only. A final listing for recommended spares will be offered after component selection and designs have been finalized	

Controls Scope of Supply Summary

Unit Control Board

- NEMA 12 indoor enclosures
- Manual and automatic synchronizing
- GE 90-30 series PLC for automatic control
- Operator interface
- Laser printer
- GE SR489 multi-function protection relay
- Basler 87G generator differential protection relay
- Utility grade meters and switches
- Annunciator for alarm indication
- Airpax speed monitoring system
- Ethernet to fiber optic converter
- Installation and wiring of DECS 200 style excitation system (supplied by “others”)

Plant Control System (continued)

Rackhouse Remote Telemetry Unit

- NEMA 4 outdoor enclosure
- GE VersaMax PLC
- Ethernet to fiber optic converter
- Submersible level transducers

Central Avenue Remote Telemetry Unit

- NEMA 4 outdoor enclosure
- GE VersaMax PLC
- Ethernet to fiber optic converter
- Submersible level transducer

Supply of Current and Potential Transformers

- Four (4) ITI potential transformers with a 11,500:120 ratio
- Twelve (12) ITI current transformers with a 500:5 ratio

Vibration Monitor

- Vibration monitor and four (4) proximity sensors (proximity sensors to be installed by turbine contractor)

Items Supplied by "Others" not included in Phoenix Scope

- Unloading of materials and storage of materials at site
- Erection or installation (supervision from Phoenix is available at our daily rates)
- Powerhouse cable tray and/or conduit
- Interconnect diagram
- All civil works
- Programming associated with the Tetragenetics SCADA system
- Fiber optic communication link between the station and remote locations
- Generator, turbine, and associated accessories
- Governor and associated accessories
- AC motor starters and DC contactors for HPU system
- Main Power Transformer
- Main Power Breaker
- Station Service Transformer
- 125 VDC battery system
- Switchgear and associated accessories
- Mechanical protection devices
- Excitation system *(included with Generator Scope)*
- Neutral grounding transformer equipment *(included with Generator Scope)*
- Generator termination cabinet *(included with Generator Scope)*
- Toothed gear for speed monitoring *(included with Generator Scope)*
- Turbine blade position transducers *(included with Turbine Scope)*

Plant Control System (continued)

Control System Technical Data, Comments and Clarifications

Open Architecture

The best way to protect the plant owner's investment over time is to provide a control system with open architecture. As the plant's regulatory or operational needs change and grow, the control and electrical system must also change and grow with minimal cost and difficulty. Our response to this need is to provide a system of "off-the-shelf" hardware and software from leading suppliers to form a reliable integrated set of plant controls commonly referred to as a "practical open system". We define a practical open system from the standpoint of the end user: *an open system is one that can evolve, i.e. can be upgraded or enhanced with minimal time or expense in ways not anticipated by the designers*. This approach:

1. Provides the owner with flexibility for future changes; either internal changes to increase output or to control costs as well as external changes required by regulations or customers.
2. Assures the timely availability of reasonable repairs or replacement and avoids the "discontinued for manufacture" and higher costs usually associated with a proprietary design or supplier.
3. Relates to the selection of a top PLC manufacturer (GE) and other control system components that have broad, international industry support.

Operating Modes

The four operating modes that shall be supported by the control system are described below. Mode selection is primarily controlled by switches located on the switchboard. The unit controller (PLC) will be programmed to anticipate the remote automatic control mode changes. Automatic startup and other commands made from the operator terminal shall require "select-before-execute/check-back-before-operate" logic.

Off Mode - This mode is used when the plant is idle or when maintenance and repairs are performed. All control functions shall be disabled in the Off Mode. If the unit is running and the system is placed in the Off Mode, an immediate normal (soft) shutdown shall occur. In the Off mode no local or remote automatic commands shall be accepted.

Manual Mode - In the Manual Mode, unit control shall be from the Main Control Switchboard. All automatic control functions shall be disabled. All control functions such as start/stop, generator breaker trip/close, impeller blade open/close, and auxiliary equipment shall only be operated directly from switches on the main switchboard. Coordination and consideration for stable manual operation is necessary with the turbine control components such as the hydraulic valves, HPU design, etc. In manual operation, settings such as blade position may naturally drift and it is expected that the operator would make the necessary manual correction. Once the operations staff is familiar with the automatic control system, this manual operating mode will primarily be used for maintenance, testing and emergency operation.

Plant Control System (continued)

This manual function, while supervised and executed by the plant controller (PLC) has the same “feel” and need for operator participation as traditional “hardwired” independent manual control. By utilizing the existing PLC circuits, this approach offers flexibility and simplicity not possible with traditional relay based logic.

Local Automatic Mode - Local Automatic Mode places the plant controller in automatic control of the plant. The controller performs the automatic start up and operation of the turbine/generator as long as the headwater level is sufficient and all other plant permissives allow for unit operation. The start command shall come from a switch on the switchboard or from an operator terminal. The controller steps the turbine/generator through the start sequence, checking to make sure pressures, flows, etc. are correct, modulates the impeller blades to safely bring the machine up to speed and coordinates with the synchronizer to automatically put the generator on-line. For safety reasons remote operation is “locked out” in this mode. Automatic shut down and any automatic restart sequences for the turbine-generator shall similarly be performed by the PLC. The automatic control mode will coordinate with the voltage regulator to control reactive power for voltage or power factor adjustment. Typically, manual emergency stop and breaker-trip functions remain operable in Local Automatic Mode.

Remote Automatic Mode – Remote Automatic Mode shall be the normal mode of operation for Unit 2 and functions essentially the same as Local Automatic Mode. When Remote Auto is selected, the unit is controlled via pulse signals from the SCADA where commands are issued to the governor and voltage regulator to start/stop, raise/lower speed or load, and raise/lower voltage. In this control mode, the PLC will initiate all logic and control functions necessary for safe, efficient automatic operation of the station.

Control Modes

Our proposal includes those automatic control modes described in Specification Section 20007-1.05. In the design stage, when the Software Design Documents (SDD) are being created, our engineers will discuss (and submit for approval) reasonable enhancements to these control modes and alternate control modes with the owner's engineers or consultants. These automatic control modes are functional when the Local or Remote Automatic Operating Modes are selected and shall be capable of being overridden by the operator to permit manual operation without the use of the system PLC.

Head Pond Level Control – Head Pond Level Control shall cause the plant to maintain the head pond level equal to an operator selected set point. The unit shall automatically start when enabled and when pre-start permissives are met and maintain the head pond at the set point. The operator establishes set points from the local operator interface terminal or from the remote SCADA terminal. Based on the turbine manufacturer’s data, the plant controller selects the position of the impeller to most efficiently

Plant Control System (continued)

achieve the set point. The unit shall stop when disabled. If the head pond level falls below the set point, unit output is reduced until minimum level and minimum output is reached at which time the unit will shutdown. If water level is restored, the unit shall automatically restart. Other operational interlocks not yet defined between the Unit 2 intake head works, trash racks, etc. may also initiate a unit shutdown in this mode.

Cycling Control - Cycling control shall cause the unit to operate at the best efficiency point during low flow periods. The water level set point shall be adjustable by the operator by using the operator interface or from the "owners" SCADA terminal.

Watt/VAR Load Control – Shall cause the unit to maintain a kilo-Watt or kilo-VAR set point. Power control shall be adjustable by the operator by changing the set point from the operator interface or from the "owners" SCADA terminal.

SCADA

We assume the existing Tetragenetics HMI terminals are programmed therefore we have not included any SCADA software or programming for this system.

Governor

The unit proposed herein is designed for operation only while connected to a stable utility grid. Isolated, isochronous (speed governing) operation is not proposed and no governor is proposed

Excitation System

Our proposal includes installation and wiring of the digital excitation control system, provided by the generator supplier, in the unit control cabinet.

Vibration Monitor

Phoenix has proposed a Bentley Nevada vibration detector and four (4) 3300 XL proximity sensors to monitor the turbine guide bearings. The vibration monitor will be capable of providing instantaneous readings, including alarm and shutdown conditions, which will be displayed on the station monitor. Vibration sensors are included to be installed by the turbine contractor.

Programmable Logic Controller

The GE 90-30 Programmable Logic Controller (PLC) with appropriate I/O has been selected for the turbine-generator start/stop sequencing, coordination, and automatic control functions of the plant. The PLC coordinates all manual plant functions to assure "bumpless" transfers from manual to automatic modes of operation. The GE 90-30 PLC is well suited for this installation with regard to noise immunity, reliability and expandability. Phoenix has proven automatic control algorithms which are programmed into the PLC using the latest GE programming format.

Plant Control System (continued)

The proposed PLC will provide all discrete and analog interface points that are necessary to perform the automatic control, monitoring, and data logging functions. A feature the PLC provides is that all input and output signals are accessible through a common communications bus which will be utilized to transmit/receive data from remote locations.

Multifunction Protective Relay

The GE Multilin SR489 protective relay has been selected to provide multi-function capability. This relay supplies the PLC with all the required plant power values via a high speed I/O bus. These powerful devices simplify the controls design by connecting directly to PT and CT secondary's. Each multi-function relay will accommodate up to 12 RTD inputs to manage temperature protection in coordination with the plant PLC.

Automatic Synchronizer

The Clifton Labs Hydro-Synch 100 has been selected to provide the breaker closing signal when voltage, frequency, and phase differences are all within specified windows. This high performance unit utilizes advanced digital technology for precise speed regulation to phase-lock the generator to the utility before initiating a breaker closure for automatic synchronization. Phoenix will provide a separate, independent synch-check relay to be used in both the automatic and manual synchronization process and serve as a secondary protective device to prevent the unit circuit breaker from closing when conditions are not within specified limits.

Synch Check Relay

Basler BE1-25 synch check relay, or equal.

Operator Interface

A Schneider Automation Magelis XBTG operator interface terminal (OIT) has been selected to display, monitor, and control the automatic control system. The TFT color touch screen will have function control capabilities and display operator selected elements clearly on the screen by the use of inverse video technique. The OIT will display the station one-line diagram and show status of the generating unit as well as displaying unit output in kW, kVAR, amperes, volts, frequency, power factor, bus voltage, bus frequency, and temperatures monitored by the RTD's. The OIT shall include an "on screen" keyboard and a 4 Gbyte memory card for data storage.

Lockout Relay

Electroswitch series 24 utility grade switchboard type lock-out relay with 125 VDC coil, or equal**.**

Control Switches

Utility grade switchboard type GE SB-1 series, or equal.

Plant Control System (continued)

Panel Meters

Meters are utility grade switchboard type, 4-1/2 inch meter face, provided to supplement the plant data that is also available on the OIT and the SR 489 protective relay will be YEW series AB-40, or equal.

Annunciator

22 windows, 2 high by 6 wide dual window lamp box with integral push button station and modbus interface will be Panalarm series 90A, or equal.

Digital Multi-function Meter

Digital display of V, A, kW, kVAR, F, kWh, kVARh, Electro-Industries series Shark100, or equal.

Speed Monitor

Airpax model TachPak III, or equal.

Indicating Lights

LED utility grade GE series ET-16, or equal, are provided to define system status.

Power Supplies

Phoenix Contact Quint PS100 series, or equal.

Auxiliary Control Relays

Unit and utility protection will be utility grade, AB 700D series, or equal.

Auxiliary Relays

Finder series 62, or equal.

Enclosures

36” wide x 36” deep x 90” high sections, NEMA 12 standard construction with minimum 12-gauge sheet metal. Paint will be individual manufacturer’s standard. All enclosures will have white interiors and ANSI gray exteriors, Hammond, or equal.

Terminal Blocks

The majority of all incoming and outgoing wiring to and from the unit controller will utilize utility grade, States NT terminal blocks with center marking strip, or equal. Potential and current transformer circuits will utilize utility grade, States NT shorting and non-shorting type terminal blocks with center marking strip, or equal. The incoming and outgoing wiring for the remote telemetry units will utilize high-density terminal blocks, Altech screw clamp, or equal.

Plant Control System (continued)

Wiring

Stranded copper, switchboard type with 600 volts SIS insulation. Wiring terminals on applicable circuits will be insulated ring-tongue double indented type. High-density circuits use a reliable screw-clamp type termination. All wire will be tagged with wiring numbers corresponding to schematic diagram designations**.**

Spare Parts

A listing of recommended spare parts has been included in our proposal for estimating purposes only. This list may need to be revised after final design and component selection has been determined.

Programmable Logic Controller

We have included GE 90-30 software to program the algorithms into the PLC for the start/stop sequence, monitoring and automatic control functions. This software will be licensed to the “owner”.

Operator Interface

We have included Vijeo Designer software to program the operator interface to display the appropriate screens for monitoring and control.

Remote Telemetry Units

Enclosure -

20” high x 20” wide x 8” deep NEMA 4 wall mount enclosure, standard construction with minimum 12-gauge sheet metal. Paint will be individual manufacturer’s standard. All enclosures will have white interiors and ANSI gray exteriors, Hammond, or equal.

Programmable Logic Controller -

The GE VersaMax PLC with appropriate I/O has been selected to monitor and control the input and output signals at the Rackhouse and Central Avenue remote sites. The remote PLC’s will communicate with the station PLC via the fiber optic communications link supplied by RG&E.

Ethernet to Fiber Optic Converter -

B&B Electronics model EIR-S-SC, or equal.

Fiber Optic Patch Panel -

Fiber optic patch panels and fiber optic interconnect cables have not been included in our proposal and is assumed to be supplied by “others”.

Submersible Level Transducer (Rackhouse and Central Avenue Pond) -

KPSI series 320T with 30 feet of cable, 4-20 mA output, or equal. The range of the transducer will be selected as required by site conditions.

NOTE: Communications Interface with Existing SCADA

We have assumed that an Ethernet connection is sufficient to interface with the “owners” existing Tetragenetics Supervisory Control and Data Acquisition system. Phoenix will provide a PLC register listing to identify the memory locations of unit data. Any additional components or programming services required to establish this interface is not included in our proposal and is at extra cost.

Miscellaneous Proposal Clarifications

1. Any applicable Federal, provincial or local taxes are not included in the proposed prices. Applicable customs, duties, etc. are included in the proposed price.

2. All field installed interconnecting piping (and associated fittings, valves, etc.) between the major equipment assemblies including any necessary water lines or water drain lines, lubricating oil lines or air lines are not included in the proposed scope. Interconnecting wiring, communication lines, cables, conduit, cable trays, raceways, trench covers, etc. between the major equipment assemblies are not included. The design and routing of the above interconnecting piping, wiring, conduit, etc. are not included.

3. Auxiliary powerhouse equipment such as switchyard, main power transformer, powerhouse crane, heating/ventilation equipment, compressed air systems, sump pump systems, trashracks, interconnecting wiring, SCADA system and communication lines are not included.

4. Any specialty tooling required to install/assemble the turbine equipment is included. Slings, shackles, cables and other common rigging devices as well as common millwright tools are not included. It is specifically noted that this proposal does not include on-site installation or construction work. Field service representatives from VA TECH HYDRO are available during installation and testing at the rates quoted in the bid forms.

5. A formal stand-alone operator training program has not been included in the proposed scope. Informal training of Owner's operating personnel can frequently be accomplished during the equipment installation testing and start-up activities while VA TECH HYDRO field service personnel are contracted to be on site.

6. Any cooling water sources required for proper operation of shaft seals and/or bearings are not provided.

7. Delivery of the equipment and goods shall be FOB jobsite assuming free and easy access to the site by commercial carrier. Off-loading of equipment at the site is by others.

8. The unit proposed herein is designed for operation only while connected to a stable utility grid. Isolated, isochronous (speed governing) operation is not proposed. Analysis of and determination of the wicket gate closing time rates in order to limit penstock pressure rises to acceptable levels is the responsibility of the customer.

9. The Customer / Owner shall furnish the hydraulic oil for the unit, once delivered on-site.

10. No noise level guarantee is offered for the proposed equipment.

Miscellaneous Proposal Clarifications (continued)

11. Generator:

- Vent plates (vent spacers) and clamping fingers will be made of carbon steel.
- The stator coils will not be provided with transpositions.
- The thrust bearing shoes will be self-equalizing and not contain jackscrews.
- No air exhaust ducting or louvers are included in this quotation.
- The solenoid operated valve or the hand-operated valve are not provided in this quotation. Interconnecting piping between the HPU, control valves and the brakes is not included.
- Hyundai-Ideal Electric is proposing a fused power isolation transformer, as detailed previously. A fused disconnect switch is not proposed
- Cable from the AVR cubicle to the generator field terminals is not included with this quotation.
- No sliprings or brush assemblies are provided with a brushless excitation system.
- The voltage regulator will be a Basler Electric DECS 200.
- Hyundai-Ideal Electric is proposing a brushless exciter.

Scope Not Included

The equipment supply not in the proposed scope includes:

- Turbine Inlet Valve
- Switchgear, Motor control center, distribution systems, substation systems
- Main Power transformer
- Powerhouse design including design of concrete structural elements (re-bar, dowels, etc.)
- Powerhouse crane or other lifting equipment
- Powerhouse heating and/or ventilation system(s)
- Equipment on-site assembly and installation including commonly used tools, slings, rigging, etc.
- Handrails, stairs, ladders, covers, etc.
- Safety covers for rotating parts

SECTION 4 - GUARANTEES

Efficiency guarantee

Any guaranteed turbine efficiencies stated in this proposal are fully guaranteed by VA TECH HYDRO. Should the actual weighted efficiency, when tested in accordance with the latest edition of the International Electrotechnical Commission, International Code for Field Acceptance Test of Hydraulic Turbines, Publication No. 41, be deficient by more than the test tolerance from that guaranteed, the runner may be returned to VA TECH HYDRO for modification or replacement at its option, or the customer may be compensated for any deficiency in excess of the testing tolerance as may otherwise be agreed upon.

Unless otherwise agreed to, performance tests shall be run by independent experts. VA TECH HYDRO reserves the right to have present members of its staff, or experts appointed by them.

The test instruments and procedures shall be selected so as to reach a test tolerance of no more than plus or minus 2%. At least 4 tests shall be carried out to measure the turbine efficiency at 4 different discharge flows in the guaranteed flow range. The weighted efficiency shall be calculated using the 4 different results of measurement. Flows, weights, and total test accuracy shall be as mutually agreed upon between the customer and VA TECH HYDRO before the performance tests are run.

Under no circumstances shall VA TECH HYDRO be liable for the cost of running field acceptance tests.

Note that the output and efficiency values proposed herein presume proper intake flow conditions. In order to achieve proper operation of the units, it is recommended that the following criteria apply:

1. The turbine intake as well as the draft tube outlet must have sufficient submergence.
2. Flow must be free from separations and air-entraining vortices.
3. Velocity distribution must be within +/- 10% of the average velocity for at least 80% of all velocities.
4. Maximum deviation of velocity must not exceed 20% of the average velocity locally. Locally limited deviations are accepted whereas Criteria 1 must still be respected.
5. The deviation between the left and the right half of the turbine inlet must not exceed 5%.

Cavitation

The runner is guaranteed against excessive damage due to cavitation. Based upon an inspection to be performed after 1 year of operation, if excessive damage due to cavitation is found, VA TECH HYDRO shall modify or replace the runner at its option. Method for determining the amount of cavitation damage shall be in accordance with the procedures given in IEC Publication 609.

Excessive cavitation damage is defined as follows:

- the cavitation damaged surface is 5% or more of the runner surface in contact with water and such surface is considered damaged if metal has been removed to a depth of 7 mm or more (IEC 60609).

- Total metal removed from the runner due to cavitation greater than that listed in Section 2 of this Proposal.

Damage due to corrosion, chemical attack or erosion by solid particles (silt, sand, gravel etc.) is not covered by this guarantee.

SECTION 5 – APPLICABLE SCHEDULE

The schedule is based upon a 14 day allowance for the customer and/or his engineer to review, comment, and approve submittal of drawings by VA TECH HYDRO. We trust the customer and/or engineer will review drawings with due regard to this limited available time so that the following schedule may be satisfactorily achieved. The following submittal and delivery schedules are proposed:

Proposed Drawing/Information Submittal Schedule

Days Following
Notice to Proceed

Manufacturing Schedule ..... 30 (preliminary)
Updated in 1 month increments

Submittal Group 1 90

- Drawing List
- Preliminary Outline Drawing including overall dimensions, space requirements and major weights.

Submittal Group 2 150

- Turbine foundation drawings showing loadings and anchoring requirements
- General Arrangement/Outline Drawings including overall dimensions, space requirements, and major weights
- Generator Outline drawings
- HPU drawings including hydraulic schematic and prelim outline drawing
- Turbine major subassembly drawings

Submittal Group 3 210

- Final outline and assembly drawings
- Three line diagram, elementary drawings and termination drawings
- Electrical equipment dwgs including I/O list, one-line diagram, controls drawings and flow diagram
- Bills of Material for all equipment

Submittal Group 4 400

- Final Technical manual(s) including start-up and operating instructions.

NOTES:

1) Connection points of piping will be shown on the detailed final drawings of each applicable component/assembly.
2) Drawings showing routing of interconnecting piping, electrical lines or conduit throughout the powerhouse are not included.
3) Powerhouse interior layout drawings are not included.

Proposed Equipment Delivery Schedule

	Days Following Notice to Proceed
Delivery Group 1	380
All pre-embedded items including draft tube liner	
Delivery Group 2	400
Generator subassemblies and electrical equipment	
Delivery Group 3	570
All remaining equipment including turbine assemblies and hydraulic pressure system	

The above schedules do not include any delay for shop inspection and factory test witnessing by customer's inspector and such shall be carried out without disturbing or delaying the normal progress schedule of VA TECH HYDRO.

Please note that VA TECH HYDRO is willing to work with the Customer regarding this schedule and to modify the delivery schedule where possible in order to best meet the Customer’s construction schedule requirements.

SECTION 6 - SHOP INSPECTION AND TESTING

Individual and assembled components are factory tested to confirm proper fabrication and operation. The following factory tests are performed as part of our quality control program:

Turbine

Intake assembly weldings are checked by a liquid penetrant test on 100% of the weldings. The turbine components are shop assembled and checked to ensure proper field assembly.

An attestation is furnished by the runner casting supplier (foundry) certifying chemical analysis of the runner blade material.

The turbine runner castings are 100% inspected using the liquid penetrant inspection method. The runner hub, blades, and blade operating mechanism are shop assembled and the blades are stroked throughout their full range to confirm proper operation.

The wicket gates, inner and outer gate barrels and gate operating mechanism are shop assembled and the gates are stroked throughout their full range to confirm proper operation.

During manufacturing the parts in the factory will be controlled by the VA TECH HYDRO independent quality control department. Our Quality Assurance System is based on the requirements of DIN ISO 9001. Not included are:

- Radiographic examinations
- Additional tests and/or inspections beyond our standard scope
- Expenses of purchaser's personnel, inspectors or their delegates
- Costs for independent witnessing institutes

Hydraulic Pressure Unit

Hydrostatic tests are performed

An operational test is performed

Generator

The generator is given standard commercial tests to ascertain that the generator is free from electrical and mechanical defects. These include factory run overspeed tests. In addition, an efficiency test is performed to show conformance to the generator efficiencies proposed herein.

Electrical Control System

Extensive and thorough testing of all equipment supplied by Phoenix Power Control, Inc. is conducted at the factory before shipment:

After the initial point-to-point testing of the system wiring the equipment is connected to the test panel and simulated plant signals are used to test the completed system. This detailed testing greatly reduces the potential time spent in the field during start up.

Our clients are always invited to attend this or any other testing that takes place during the course of the project. With major systems, it is strongly encouraged that the client attends and witnesses the final integrated testing.

VATECH HYDRO ANDRITZ

Typical VA TECH QA Inspection Plan

VATECH

VA TECH HYDRO

No.	Group No.	Quality	Work piece / Dimensions	Material / Specification	Quality Inspections: Semi-finised / unmachined part — W (1 2 3 4 5)	Z (1 2 3 4)	K (1 2 3)	So (1 2)	Certificate	Machined part — W (6)	Z (1 2 3 4)	K (1 2 3)	B (1 2 3 4 5 6)	So (3 4 5)	Certificate	
1	020 10	1	Kaplan runner shop assembly								E	E	E E	E	3.1.B	B3: Runner complete and runner blade sealing
2	021 02	1 set	Runner blade	GX4CrNi13-4+QT1	H / H H	H	H H		2.3 / 3.1.B		E	E / E			3.1.B	
3	022 01	1	Runner hub	G20Mn5V	H / H H	H	H H		2.3 / 3.1.B		E	E			3.1.B	Z4: Transitions and areas between blade bores
4	022 02	1	Runner hood	S235JRG2	H H							H			3.1.B	Z4: Welding seams
5	025 03	1 set	Levers	C45E+N	H / H H				2.3 / 3.1.B		E	E			3.1.B	Z4: Transitions

W Testing of material: W 1 Chemical analysis; W 2 Tensile test; W 3 Impact test; W 4 Bend test; W 5 Hardness test; W 6 Confusion test

Z Non-destructive examination: Z 1 Visual examination; Z 2 Ultrasonic examination; Z 3 Radiographic examination; Z 4 Surface crack examination

K Checking: K 1 Dimensional check; K 2 Shape and position check; K 3 Surface check

B Testing of component: B 1 Clearance for dispatch; B 2 Pressure test; B 3 Leak test; B 4 Static balance test; B 5 Dynamic balance test; B 6 Centrifugal test

So Special test: So 3 Marking; So 4 Provisional function test; SPP Welding and Testing Plan

Inspection / Reception by: H Manufacturer; E VA TECH ESCHER WYSS GmbH Ravensburg; A Inspection organisation; K Customer; O Site erection

Certificates according to EN 10 204

Order No.	M-1305200-A	Code word	Kongsfoss 03	Designation	1 Compact Axial Turbine (CAT) D1 = 1770	
Customer		Amendment / Supplements		Dept.	Name/Signature	Date
Inspection Organisation				Q	W. Hagnauer	16.05.2003
VOEST mce ELIN SAT				HC	M. Schilling	16.05.2003
		Distributor	Client, HC, Q	Testing and Inspection Plan No. 891 027 265		

No.	Group No.	Quality	Work piece / Dimensions	Material / Specification	Quality Inspections: Semi-finised / unmachined part — W (1 2 3 4 5)	Z (1 2 3 4)	K (1 2 3)	So (1 2)	Certificate	Machined part — W (6)	Z (1 2 3 4)	K (1 2 3)	B (1 2 3 4 5 6)	So (3 4 5)	Certificate	
6	025 03	1 set	Bolts for runner blades	30CrNiMo8	H / H H	H			2.3 / 3.1.B	H		H		H	3.1.B	
7	026 01	1	Runner servomotor shop assembly										E		3.1.B	
8	026 01	1	Runner servomotor cylinder	S335J2G3	H / H H	H			2.3 / 3.1.B			H / H			3.1.B	Z4: Transitions
9	026 02	1	Central bolt	30CrNiMo8	H / H H	H			2.3 / 3.1.B			E			3.1.B	Z4: 100%
10	030 01	1	Turbine shaft	C35E+N	H / H H	H			2.3 / 3.1.B			E E E			3.1.B	Z4: Transitions
11	031 01	1	Coupling element Shaft / Generator	St						H		H		H	3.1.B	
12	032 01	1	Shaft liner for guide bearing	Stainless steel / PE-UHMW	H H				2.2			E			3.1.B	
13	040 01	1	Throat ring stainless steel in spherical area	S235JRG2 / 1.4306	H / H H				2.3 / 3.1.B			H H			3.1.B	Z4: Welding seams
14	041 01	1	Inner ring for gate mechanism	S235JRG2+N	H / H H				2.3 / 3.1.B			H H			3.1.B	Z4: Welding seams

VATECH HYDRO ANDRITZ

Typical VA TECH QA Inspection Plan (continued)

No.	Group No.	Quality	Work piece	Material	Quality Inspections																																	
					Semi-finised / unmachined part															Machined part																		
					W					Z				K			So		Certificate	W	Z				K			B						So			Certificate	
			Dimensions	Specification	1	2	3	4	5	1	2	3	4	1	2	3	1	2		6	1	2	3	4	1	2	3	1	2	3	4	5	6	3	4	5		
15	042 01	1 set	Guide vanes	G20Mn5	H														2.3					H	H												3.1.B	Z4: Transitions
						H	H				H		H	H					3.1.B																			
16	043 02	1	Outer ring for gate mechanism	S235JRG2+N	H														2.3					H	H												3.1.B	Z4: Welding seams
						H	H												3.1.B																			
17	049 01	1	Gate servomotor																						H				H						H		3.1.B	K1: Stroke
18	050 01	1	Turbine housing	S235JRG2+N	H														2.3					H	H												3.1.B	Z4: Welding seams
						H	H												3.1.B																			
19	103 01/ 02	1	Generator																																H		3.1.B	
20	110 01	1	Draft tube	S235JRG2+N	H														2.3					H	H												3.1.B	Z4: Welding seams
						H	H												3.1.B																			
21	180 01	1	Turbine shop assembly																		E							E							E		3.1.B	
22	180 01	1	Turbine shop assembly																		E							E							E		3.1.B	
23	302 01	1	Govenor oil supply system	Stainless steel																															H		3.1.B	

SECTION 7 - PROTECTIVE COATINGS

Turbine

Painting Specification Standard
Compact Kaplan, Bevel Gear Bulb Turbine
Belt Drive Bulb Turbine, Compact Axial Turbine

VATECH

Items covered by the contract	Primer coat	Top coat
exposed to water	X	X
exposed to oil	X	X
exposed to air	X	X

1 Surface preparation

1.1 Before the machining operations starts sandblast or shotblast all castings and welded fabrications to a metallic bright finish - rust removal level Sa 2 ½ as per DIN EN ISO 12944 part 4.
Apply the first primer coat within 8 hours after the sandblasting or shotblasting operation

2 Paint Structure

2.1 Surfaces exposed to water
Surfaces marked with **W** on the drawings
Aggregate dry film thickness 250 microns.
Treat surfaces alternately exposed to air and water
as surfaces exposed to water
Mechanical treated surfaces must be sandblasted or shotblasted again!

2.1.1 Primer coat 1 (shop handling coat)
Icosit EG 1
Dry film thickness 30 microns

2.1.2 Primer coat 2
After the machining apply a coat of
Icosit EG 1
Dry film thickness 40 microns

2.1.3 Top coat
After completion of the work as per 2.1.2 apply a coat of
Inertol Poxitar SW
Dry film thickness 180 microns

2.2 Surfaces exposed to oil
Surfaces marked with **O** on the drawings
Aggregate dry film thickness 50 microns

2.2.1 Primer coat
Schwaabetan-2K-Primer
alternative
Icosit EG Phosphat
Dry film thickness 20 microns

2.2.2 Top coat
After the shop assembly apply a coat of
Icosit EG Phosphat
Dry film thickness 30 microns

Painting Specification Standard
Compact Kaplan, Bevel Gear Bulb Turbine
Belt Drive Bulb Turbine, Compact Axial Turbine

VATECH

2.3 Surfaces exposed to air
Surfaces marked with **A** on the drawings
Aggregate dry film thickness 110 microns

2.3.1 Primer coat 1 (use of „primer coat 1I" will be optional)
Schwaabetan-2K-Primer
Dry film thickness 10 microns

2.3.2 Primer coat 2
Icosit EG 1
Dry film thickness 40 microns
if primer coat I „Schwaabetan-2K-Primer" will not be used,
the primer coat II will have dry film thickness of 50 microns.

2.3.3 Top coat
Icosit EG 5
Dry film thickness 60 microns
(mind the colour)

3 Piping

3.1 Pipes on the hydraulic control unit
Pickle and neutralise the piping

3.1.1 Inner surfaces: wet properly with oil, and plug the pipe ends

3.1.2 Outer surfaces: paint structure as per 2.3.2 and 2.3.3
colour like the hydraulic control unit.

3.2 Connecting pipes
are hoses without paint

3.3 Concrete-embedded piping
Steel-pipe: hot galvanised according to DIN 50976
PE-Pipe: without painting

4 Machined surfaces

4.1 Surfaces marked with **B** on the drawings
Icosit EG 1
Dry film thickness 50 µm

4.2 Surfaces marked with **P** on the drawings
as well as countersinkings and sealing key ways.
Icosit EG Phosphat
Dry film thickness 20 µm

4.3 Surfaces marked with **X** on the drawings will obtain conservation for transport.

4.4 After the hydraulic prestressing apply on the threads and nuts of the hydraulically prestressed screws a coat of Inertol Poxitar SW

Painting Specification Standard
Compact Kaplan, Bevel Gear Bulb Turbine
Belt Drive Bulb Turbine, Compact Axial Turbine

VATECH

5 Concrete-embedded parts

Surfaces marked with **C** on the drawings
Schwaabetan-2K-Primer
alternative
Icosit EG Phosphat
Dry film thickness 10 microns
At the interfaces (air/water - concrete) paint a length of 10 cm projecting into the concrete like surfaces exposed to air or water.

6 Parts made of stainless steel or non-ferrous metal

Do not paint parts made of stainless steel or non-ferrous metal
not even with a coat for shipment)

7 Application of the coats of paint

7.1 Do not apply any coats of paint until after a possibly required testing of the weld seams.

7.2 For the hydrostatic pressure test apply at least one complete primer coat.

7.3 Before applying a coat of paint make sure that the previously applied coat is in a proper condition. If necessary, make the required corrections.

7.4 Make sure the individual coats of paint differ clearly in colour.

7.5 Wait the specified period of time before applying the next coat of paint.(see specification sheet).

7.6 Make sure the painted surfaces are free from runs, droplets, elevations, pinholes, and other short-comings.

7.7 Apply the coats of paint in such a way that a film of uniform thickness will be obtained covering all corners and edges.

7.8 Mind that the indicated dry film thicknesses are the specified dry film thicknesses.

7.9 On assemblies which after the shop assembly are no longer accessible apply the final paint structure.

7.10 Valves, fittings and assemblies supplied by subcontractors are provided with their standard paint structures.

7.11 The coating marks (**W, O, A, P, B, C, X**) on the drawings should be treated like surface marks.

8 Marking

Mark all cases, parts and other shipping units by use of weatherproof paint.

9 Guarantee

for 2 years, according to ISO 4628 or DIN 53210 standards, using rust grade Ri 2, except damages and erosion caused by elements contained in the water.

10 Manufacturer of the paints

Schwaabetan 2K Primer:	Fa. PPG Schwaab GmbH,	D-76356 Weingarten
Icosit EG 1	Fa.Sika Chemie GmbH,	D-70439 Stuttgart
Icosit EG 5, EG Phosphat		
Inertol Poxitar SW		

Generator

The generator is painted in accordance with the manufacturer's standard procedures.

Auxiliary Equipment

Components such as electrical boxes, hydraulic pressure unit and other auxiliary components are painted in accordance with the manufacturer's standard procedures.

SECTION 8 - FIELD SERVICE RATES AND TERMS

VA TECH HYDRO recommends the services of qualified erection specialists for advice and consultation during certain periods of equipment assembly, embedment and installation. Such field representatives would be made available from VA TECH HYDRO and/or from the generator/control system suppliers. The total time that we would expect to be required for the turbine/generator site assembly and installation varies depending on the experience and capabilities of the installation contractor and can range from 60 to 120 days. The time required would also be dependent upon installation of associated equipment not within the contracted scope.

A proposed schedule for provision of VA TECH HYDRO field service representation is as follows:

Field Representative during unit installation/assembly (12 man-weeks)

Number of personnel	3		
1 turbine rep		-	8 weeks
1 generator rep		-	2 weeks
1 controls system rep		-	2 week
Number of trips to site	4		

Start-up/Commissioning (5 man-weeks)

Number of personnel	3		
1 turbine rep		-	2 weeks
1 generator rep		-	1 weeks
1 controls system rep		-	2 weeks
Number of trips to site	3		

Total number of man-weeks proposed - 17 man-weeks

The above estimates are not guaranteed. The installation contractor may require additional support time from a VA TECH HYDRO field representative depending on the contractor's skill level or experience. Time for field representation may also vary due to installation or start up activities not related to VA TECH HYDRO provided equipment scope.

Additional time for field service representation would be provided in accordance with the attached VA TECH HYDRO field service rate schedule.

VATECH HYDRO ANDRITZ

EXHIBIT A

FIELD SERVICE RATE SCHEDULE (EFFECTIVE FOR 2005)

Outlined below are the terms and conditions applicable to charges for the Services of VA TECH HYDRO USA Corporation representatives.

1. **DAILY RATES:** The daily rates for VA TECH field service personnel are based upon an eight hour day for each day away from VA Tech's home office, not including Saturday, Sunday, or holiday work. The daily rates are:

Installation and Erection Advisor	$ 1,243.70
Governor Technician	$ 1,355.28
Engineer	$ 1,489.88

Depending on circumstances, a higher rate may apply for specialists from Europe.

2. **OVERTIME**: The charges for time, during the course of VA Tech's Services away from VA Tech's home office, when VA Tech personnel work, are traveling, are on stand-by, or any combination of the three (1) in excess of eight hours in any calendar day Monday through Friday or (2) on a Saturday, Sunday, or holiday are:

Installation and Erection Advisor	$ 233.19/hour
Governor Technician	$ 254.11/hour
Engineer	$ 279.35/hour

Depending on circumstances, a higher rate may apply for specialists from Europe.

3. **HOURLY** RATES; The hourly rates for Services performed at VA Tech's home office are**:**

Installation and Erection Advisor	$ 145.84/hour
Governor Technician	$ 159.79/hour
Engineer	$ 176.61/hour

Depending on circumstances, a higher rate may apply for specialists from Europe.

4. **GENERAL PROVISIONS:**

4.1 **Administrative Mark-up.** Reimbursable Expenses as defined in the Agreement will be billed at 1.15 times the cost incurred.

4.2 **Mileage.** VA Tech will charge $0.50 per mile for and on account of the use of privately owned vehicles in furtherance of the Services.

4.3 **Subcontractor cost and Materials Mark-up.** VA TECH will bill actual subcontractor invoice cost, and any materials supplied by VA TECH or subcontractor at 1.25 times the cost incurred.

VA TECH HYDRO ANDRITZ

GENERAL TERMS AND CONDITIONS

SECTION 9 – COMMERCIAL TERMS AND CONDITIONS

The following General Terms and Conditions of Supply shall apply to the sale and supply of Goods and Services by VA TECH HYDRO Canada Inc., (hereinafter called the "COMPANY") and shall form the Contract with the Customer unless modified as herein provided.

1. **DEFINITIONS**

1.1 The following terms shall have the meanings indicated wherever used in these General Terms and Conditions of Supply. These definitions shall apply to the Contract unless otherwise indicated therein by the parties.

"COMPANY" - shall mean VA TECH HYDRO Canada Inc., and its successors and assigns.

"Consultant" - shall mean the person, firm or corporation which may be appointed to the Project who is identified as such in the Contract and is an architect or engineer licensed to practice in the jurisdiction of the place of the Project. The term Consultant used in the singular shall include the plural where there are more than one Consultant appointed to the Project and identified as such in the Contract. The Consultant shall be deemed to be the authorized agent of the CUSTOMER. Where a Consultant is also appointed by the Owner, as the case may be, that Consultant shall be deemed to be an authorized agent of the OWNER.

"Contract" - shall mean the written agreement between the COMPANY and the CUSTOMER covering the furnishing of the Goods and Services and comprised of the Contract Documents.

"Contract Documents" - shall mean the written agreement executed between the COMPANY and the CUSTOMER and all documents annexed thereto or referenced therein which shall include, without limitation, these General Terms and Conditions of Supply, subject to Article 2 herein below, the Specifications, the COMPANY's proposal or, as the case may be, bid, as may be amended with the written consent of the COMPANY prior to the execution of the Contract incorporated therein and all modifications to the foregoing subsequent to the execution of the Contract effected in accordance with the Contract Documents.

"Contract Price" - shall mean the monies payable by the CUSTOMER to the COMPANY under the Contract as stated in the Contract Documents.

"Contract Time" - shall mean the total number of days or the dates stated in the Contract Documents for the furnishing of the Goods and performance of the Services.

"CUSTOMER" - shall mean the person, partnership, association, corporation, public body or authority with whom the COMPANY has entered into the Contract.

"Goods" - shall mean all material, machinery and equipment required to be furnished under the Contract Documents for incorporation into the Project. Without limiting the generality of the foregoing, the term "Unit of Goods" shall mean an assembly of equipment consisting of a hydraulic turbine, and which may or may not also include (as shall be stipulated in the Contract) a generator, complete with the relevant accessories and auxiliaries, the function of which is the generation of electricity.

"OWNER" - shall mean the person, firm or corporation who is the owner of the Project, the ultimate owner of the Goods and the ultimate beneficiary of the services where such person, firm or corporation is other than the CUSTOMER.

"Project" - shall mean the total Project contemplated of which the Work may be the whole or a part.

"Release for Manufacture" - shall mean a document issued by the CUSTOMER authorizing the COMPANY to begin manufacturing of the Goods. The date of issue shall become the first day from which "Contract time' will be measured.

"Services" - shall mean commissioning and, if stipulated in the Contract Documents, supervision of erection services to be furnished by the COMPANY but, for greater clarity, shall not include construction or installation or erection of the Goods.

"Specifications" - shall mean the portion of the Contract Documents consisting of written technical descriptions of materials, machinery and equipment comprising the Goods, standards and workmanship as applied to the Goods and Services, and certain administrative details applicable thereto.

"Substantial Performance" - shall mean substantial performance as that term or any like term is defined in lien legislation applicable to the place of the Project. If such legislation is not in force or does not contain such definition, Substantial Performance shall have been reached when the Work is ready for use or is being used for the purposes intended or is so certified by the Consultant or is being used to commercially generate electricity, whichever first occurs.

"Total Performance" - shall mean total performance as that term or a like term is defined in lien legislation applicable to the place of the Project. If such legislation is not in force or does not contain such definition, Total Performance shall have been reached when the entire Work, with the exception of minor outstanding items not affecting the operation of the Project and those items arising from provisions of Article 12 - Warranty, has been performed to the requirements of the Contract Documents whether or not so certified by the Consultant.

"Work" shall mean the total supply of all Goods and Services required by the Contract Documents.

2. **APPLICABILITY**

2.1 These General Terms and Conditions of Supply shall be valid and apply as an integral part of the Contract Documents to the extent not otherwise stipulated with the written acceptance of the COMPANY, in the Contract Documents. Any conditions stipulated by the CUSTOMER which are in contradiction with these General Terms and Conditions of Supply are valid only if accepted in writing by the COMPANY and included in the Contract Documents.

2.2 In the event of conflict between the Contract Documents, the precedence of these General Terms and Conditions of Supply shall be as agreed to by the COMPANY and contained in the Contract Documents.

2.3 If the Contract entails the supply by the COMPANY of more than one unit of Goods, the term Goods shall, for the purpose of payments, release of holdbacks, certifications, warranties, any performance guarantees, and any liquidated damages for delay or performance, and unless otherwise indicated, be a reference to each unit of Goods separate and distinct from the other units of Goods and, accordingly, the term Contract Price shall refer to the portion of the Contract Price attributable to each unit of the Goods. Any other reference to the Goods in these General Terms and Conditions of Supply and in the Contract, particularly in Article 15 - Limitation of Liability, and any like provisions of the Contract pertaining to the COMPANY's total liability, shall refer to all the units of Goods in the aggregate.

3. **CONTRACT PRICE**

3.1 The Contract Price quoted by the COMPANY in its proposal or bid is net at the stipulated FOB delivery point.

3.2 Unless otherwise stipulated in the Contract, the Contract Price quoted is exclusive of GST, ORST and other local taxes, levies and the like which are levied on or in connection with the Project, which shall be borne by the CUSTOMER or, if paid by the COMPANY, shall be refunded to it by the CUSTOMER.

3.3 The Contract Price with respect to any deliverable item of Goods or any of the Services shall be subject to adjustment, either increase or decrease, for changes in the rates of any Canadian, federal, provincial, or other sales, use or excise taxes, or customs duties applicable thereto to the extent included in the Contract Price and for any new Canadian, federal, provincial or other sales, use, excise or other taxes or duties imposed on or levied against the COMPANY applicable to the supply of the Goods and Services which become effective subsequent to the date of the COMPANY's proposal or bid, notwithstanding acceptance.

3.4 The Contract Price shall be payable in Canadian dollars and is further subject to modification to the extent of any change of foreign exchange rates (if so specified in our offer) if the Release for Manufacture is delayed beyond that quoted.

3.5 An appropriate price adjustment shall be made to the Contract Price in the event that the Contract Time is subject to extension due to any reason stated in sections 7.2 and 7.3 herein below, modification of the nature or scope of the Work by reason of incomplete or inaccurate documents or information furnished by the CUSTOMER, a change order issued by or on behalf of the CUSTOMER, a modification to existing or the enactment of new governmental or other regulations or standards which affect the Work and/or must be observed in the execution of the Contract as provided in section 8.3 herein below and as otherwise provided for in the Contract Documents.

4. TERMS OF PAYMENT

4.1 Payment for supply of the Goods shall be made in accordance with the payment schedule in Schedule I. The COMPANY shall issue an invoice for each payment milestone therein listed or actual progress as the case may be and all invoices shall be paid by the CUSTOMER within 30 days of the invoice date without deduction for cash discount, expenses, taxes, levies, fees and the like of any kind, save and except for any statutory holdback imposed by applicable lien legislation. In the absence of applicable lien legislation, there shall be no holdback retained from any monies payable to the COMPANY except as agreed to by the latter in writing and contained in the Contract Documents.

4.2 Services will be invoiced monthly and shall be paid by the CUSTOMER within 30 days of the invoice date without any deduction for cash discount, expenses, taxes, levies, fees and the like of any kind save and except for any statutory holdback imposed by applicable lien legislation.

4.3 Any holdback monies retained from payments for the Goods to the COMPANY shall be paid over to the COMPANY within 45 days of Substantial Performance and, in any event, not later than 6 months from the delivery of the Goods, unless otherwise specifically agreed in writing by the COMPANY in the Contract Documents, provided there are no serious defects or deficiencies in the Work at that time. Any holdback monies retained from payment for the Services shall be paid over to the COMPANY in accordance with applicable lien legislation. The COMPANY shall be entitled to payment for interest related to the delay of the release of the holdbacks at the rate stipulated in section 4.4 herein below.

4.4 Without limiting the COMPANY's rights and recourses in the event of late payment, overdue amounts will bear interest at the rate of 2% over the prime lending rate of the Royal Bank of Canada, calculated daily from the due date until receipt of payment in full. Should any of the payment date milestones be delayed through no fault of the COMPANY, the COMPANY shall similarly be entitled to payment for interest expense calculated daily at the aforesaid interest rate. Alternatively, the COMPANY may, in lieu of payment for interest, require full and immediate payment upon provision to the CUSTOMER of a letter of credit or other security of equivalent value.

4.5 Should the CUSTOMER or OWNER be delayed with any payment, commit an act of bankruptcy or become insolvent, the COMPANY shall have the right, at its option, and without limiting its other rights and recourses, to refuse further performance of the Contract and retain the Goods ready for dispatch until the CUSTOMER's default has been remedied or acceptable security has been provided, or to terminate the Contract and claim damages.

5. RESERVATION OF TITLE

5.1 The COMPANY shall remain owner, notwithstanding delivery, of the Goods supplied until its receipt of full and complete payment in accordance with the Contract.

5.2 The CUSTOMER shall co-operate in any measures necessary for the protection of the COMPANY's title and shall fulfil and do all acts necessary to enable the fulfilment of all formalities necessary for the creation and preservation of the reservation of title. The CUSTOMER shall further take all reasonable measures to ensure that the COMPANY's title is not prejudiced in any way.

5.3 Throughout the period during which title is reserved to the COMPANY, the CUSTOMER shall procure and maintain insurance of the Goods to their full insurable value and shall provide to the COMPANY, upon demand, adequate proof of insurance which shall be consistent with the COMPANY's title and interest and shall name the COMPANY as co-insured to the extent of its said interest.

6. PASSING OF RISK

6.1 Subject to section 6.2 herein below, the risk of loss or damage of the Goods shall pass to the CUSTOMER at the stipulated FOB delivery point, or, if the terms of delivery are other than FOB and notwithstanding that such terms may be CIF or similar clause, upon the Goods leaving the COMPANY's plant, the whole notwithstanding that the terms of delivery may be stipulated to include freight paid, that any further transport or unloading may be stipulated in the Contract Documents is to be arranged or supervised by the COMPANY or any other Services to be performed by the COMPANY.

6.2 If delivery of the Goods is delayed at the request of the CUSTOMER or due to other reasons beyond the COMPANY's control, the risk of loss or damage of the Goods shall pass to the CUSTOMER at the time originally foreseen for delivery to the stipulated FOB delivery point. The Goods shall thereupon be stored and insured at the expense and risk of the CUSTOMER.

7. CONTRACT TIME - DELAYS, FORCE MAJEURE

7.1 The Contract Time for the delivery of the Goods and performance of the Services and any other matter related to the Work shall commence once the Release for Manufacture has been issued and the stipulated down-payment has been paid by the CUSTOMER.

7.2 The COMPANY shall be entitled to an extension of the Contract Time and an adjustment to the Contract Price and/or reimbursement by the CUSTOMER for reasonable costs incurred in the following circumstances:

a) if the information required and requested by the COMPANY from the CUSTOMER or OWNER for performance of the Contract is not received in due time;

b) if changes are made in writing by the CUSTOMER or OWNER to or affecting the Work;

c) if the COMPANY is delayed in the performance of the Work by a stop-work order issued by a court or other public authority, provided such order was not issued as a result of the act or fault of the COMPANY, its employees or subcontractors; or

d) If the CUSTOMER or its contractors or agents are behind schedule with any site or other work required to be executed to receive or enable the COMPANY to perform the Work, or if the CUSTOMER is late in the performance of its obligations under the Contract or if the COMPANY is otherwise delayed by any act or omission of the CUSTOMER, its contractors or agents;

e) if any existing or new laws, governmental or other regulations or standards which affect the Work and/or which must be observed in the execution of the Contract be modified or enacted as provided in section 8.3 herein below;

f) for any other reason provided in the Contract Documents.

7.3 If the COMPANY is delayed in the performance of the Work by reason of hindrances beyond the reasonable control of the COMPANY, regardless of whether such hindrances occur with the COMPANY or its subcontractors or a third party, including, without limitation, labor disputes, strikes, lock-outs (including lock-outs decreed or recommended for its members by a recognized association of which the COMPANY is a member or to which the COMPANY is otherwise bound), any acts, omissions or regulations of any government authority or public body or utility, fire, floods, weather, acts of the elements, accidents or casualties, serious breakdowns in the COMPANY's plant, delays by common carriers or any other causes beyond the COMPANY's control, the Contract Time shall be extended for such reasonable time as shall be agreed with the CUSTOMER but, in any event, the extension shall not be less than the time lost as a result of the event causing the delay unless a shorter period is agreed to by the COMPANY.

7.4 The COMPANY shall not be liable for any costs or damages whatsoever arising from the delays resulting from the causes referred to in sections 7.2 and 7.3 herein above.

7.5 With respect to delays in the Contract Time for performance of the Work where the delay is established to have been caused through the fault of the COMPANY, unless expressly agreed in writing otherwise, the CUSTOMER shall be entitled to claim liquidated damages to the extent and amount and maximum limit set out in Schedule II attached hereto. If the amount of such liquidated damages is set out as a percentage of the Contract Price, for the purpose thereof, the Contract price shall exclude the costs of any Services, taxes, custom duties, packing or transport expenses and any additional amount in excess of the net prices of the Goods.

7.6 In the event of any such delay in the Contract Time for the performance of the Work attributable to the fault of the COMPANY, the rights and claims of the CUSTOMER shall be limited to those expressly stipulated in section 7.5, subject furthermore to section 15.2 herein below, and the CUSTOMER shall not be entitled to any other damages or indemnity nor to cancel the Contract.

8. LAWS, REGULATIONS AND SPECIAL REQUIREMENTS

8.1 Should any existing or new laws, governmental and other regulations or standards in force in the jurisdiction of the Project which affect the Work and/or which must be observed in the execution of the Contract, be modified or enacted subsequent to the commencement of the Contract Time and prior to completion of the Contract, the COMPANY shall be entitled to an adjustment of the Contract Price and, as may be necessary, an extension of the Contract Time resulting from the changes required to the Work and the Contract Documents due to any such modification or enactment.

9. PERMITS AND APPROVALS

9.1 The CUSTOMER shall obtain all permits, licenses and certificates required for the delivery and operation of the Goods and performance of the Work (other than any import licenses and transportation permits) and the CUSTOMER shall pay the fees therefor.

10. INSURANCE

10.1 Property Insurance

The CUSTOMER shall provide, maintain and pay for all-risks property insurance in which policy or policies the COMPANY shall be named as co-insured to the extent of its interests, such policy insuring not less than the amount of the Contract Price for the full replacement value of the Goods and which shall be maintained continuously until complete payment of the Contract Price, including any holdbacks, to the COMPANY. Such policy or policies shall provide that in the event of loss or damage, payment shall be made to the CUSTOMER and the COMPANY as their respective interests may appear. The CUSTOMER shall not adjust the amount of such loss or damage payment with the insurers without prior written consent of the COMPANY.

10.2 In the event of loss or damage to the Work, once the extent of the loss or damage is determined and insurance proceeds are paid out to each of the parties in accordance with their respective interests, the COMPANY shall proceed to restore the Work and shall be entitled to a reasonable extension of Contract Time relative to the extent of the loss or damage.

The payment of such insurance proceeds to the COMPANY shall be in addition to the amounts due by the CUSTOMER under the Contract and the COMPANY shall not be required to proceed to restore the Work unless and until the parties have agreed on the amount of the total insurance proceeds payable to the COMPANY and the schedule of the payment thereof.

The COMPANY shall not be responsible for any deductible amounts under the policy or policies.

10.3 General Liability Insurance

The CUSTOMER shall provide, maintain and pay for general liability insurance with limits of not less than $1 million per occurrence for bodily injury, death and damage to property including loss thereof, in which policy shall name the COMPANY, its subcontractors, and agents as co-insured, covering them and their employees and shall contain satisfactory cross-liability and waiver of subrogation clauses. Such policy shall be maintained continuously commencing from, at the latest, delivery of the Goods to the stipulated FOB delivery point, until the date of Total Performance.

10.4 The CUSTOMER shall provide the COMPANY with proof of insurance prior to commencement of the Work. Should the CUSTOMER fail to provide or maintain insurance as required in this Article 10 or elsewhere in the Contract Documents, then the COMPANY shall have the right to provide and maintain such insurance and charge the costs thereof to the CUSTOMER.

11. INSPECTION AND TESTING

11.1 The CUSTOMER, the OWNER, the Consultant and any other of their authorized agents shall have reasonable access to inspect the Goods in progress prior to delivery at the premises of the COMPANY or its subcontractors, which inspection shall be conducted so as not to interfere unreasonably with their operations.

11.2 Should the Contract Documents specify special tests to be conducted prior to shipment and require that a representative of the CUSTOMER, the OWNER, the Consultant or other of their authorized agents attend thereat, or at any specially designated inspection or approval, the COMPANY shall give the CUSTOMER, the OWNER and/or, as the case may be, the Consultant, timely notice of the date thereof. Should the CUSTOMER, the OWNER, the Consultant or their authorized representatives fail to attend at such testing, inspection or approval, notwithstanding the COMPANY's said notice, they shall be deemed to have waived any requirement of their attendance and the COMPANY shall be entitled to proceed with the Work.

11.3 Should it be determined as a result of such examination, testing or inspection that any material or item comprised in the Goods does not conform to the Specifications or other Contract Documents, the COMPANY shall be so notified immediately and shall promptly effect at its costs any repairs, changes or corrections of such non-conformance as the COMPANY may deem necessary in order to meet the requirements of the Specifications and Contract Documents provided, however, that if any repairs are significant in nature or extent (as may be defined in the Contract Documents), the COMPANY shall submit the proposed corrective action to the CUSTOMER and/or Consultant for prior approval.

11.4 Should the CUSTOMER or the OWNER require any tests not specified in the Contract Documents, the expenses, labour costs and any fees therefor shall be charged by the COMPANY to CUSTOMER who shall pay the same in addition to the Contract Price and the COMPANY shall furthermore be entitled, as may be necessary, by reason of such additional tests, to an extension of the Contract Time.

11.5 The CUSTOMER shall inspect the Goods properly after delivery to the stipulated FOB delivery point and shall immediately notify the COMPANY in writing of any defects or deficiencies for which the latter is responsible pursuant to its obligations under the Contract. Should the CUSTOMER fail to do so, the Goods shall be deemed to have been accepted subject to Article 12 which shall apply as regards defects or deficiencies that cannot be detected upon examination.

12. WARRANTY

12.1 The COMPANY warrants that the Work will conform to the Contract Documents and shall, within the warranty period herein below defined, be free of defects in material, design or workmanship.

The COMPANY agrees to repair or replace, at its option and at its expense, FOB the site, any defect or deficiency in the Work which shall, within 12 months from the date of Substantial Completion but, in any event, not later than 18 months after the date of delivery, (herein referred to as the "warranty period") be determined to have been defective in material, design or workmanship, provided the COMPANY is given prompt notification in writing of the discovery of any such defect or deficiency within the aforementioned period.

12.2 The COMPANY's warranty shall not cover and the COMPANY shall not be responsible for any defects or inadequacies in the Goods arising from errors in the specifications or other documents conceived and provided by the CUSTOMER, from the foundations or other work to be provided by or on behalf of the CUSTOMER or from the sub-surface conditions proving to be insufficient or inadequate and the COMPANY shall not have and is exonerated of any and all liability or responsibility with respect thereto and shall be indemnified by the CUSTOMER for any damages sustained as a result thereof.

12.3 The COMPANY's warranty shall terminate prematurely if the CUSTOMER, the OWNER or their contractors or a third party undertakes repairs or modifications to the Work without the COMPANY's prior written consent and supervision, except in the event of an emergency and provided that the COMPANY shall have inspected and found emergency repairs to be acceptable to it. The warranty shall also terminate prematurely if the CUSTOMER does not immediately take all appropriate steps to mitigate the damage and give the COMPANY the opportunity to remedy the defect.

12.4 Excluded from the COMPANY's warranty are damages resulting from normal wear and tear, failure to observe storage instructions, failure to observe operating instructions, improper start-up, improper operation, improper maintenance, unsatisfactory or unsuitable foundations, excessive loading, improper installation and erection performed by a third party notwithstanding supervisory Services provided by the COMPANY, damages due to flooding not attributable to any defect in the Goods or to the fault of the COMPANY, damage resulting from other contractors' supply, etc.

12.5 With respect to supplies or equipment purchased by the COMPANY for supply to the CUSTOMER or supplies and equipment prescribed by the CUSTOMER, the COMPANY does not assume any warranty or liability except to the extent of the manufacturer's warranty and only to the extent that it does not exceed the COMPANY's warranty.

12.6 The COMPANY's warranty shall extend only to the direct costs of repairing or replacing the defective parts (specifically excluding the cost of dewatering, provision of cranes and access to the equipment) and, without limiting the generality of the foregoing, the COMPANY shall not be liable for any damages or delays arising out of the repair or replacement thereof nor for any indirect or consequential damages. The warranty contained in this Article 12 or, as the case may be, in the COMPANY's proposal or bid or in the Contract Documents, is the sole warranty provided by the COMPANY to the CUSTOMER and any other warranty implied by law or statute, including, without limitation, fitness for purpose and merchantability, are hereby excluded to the extent such exclusion is not prohibited by mandatory provision of law of public order.

12.7 Any part of the Goods repaired or replaced in virtue of the COMPANY's warranty shall be further warranted for a further period of 12 months commencing from the repair or replacement.

12.8 Any Work performed by the COMPANY on materials, machinery or equipment furnished by or on behalf of the CUSTOMER shall not render the COMPANY liable for any costs or damages resulting from any inadequacy or unsuitability thereof or deficiency or defect therein. The COMPANY's liability in undertaking such Work shall be limited to the cost of the Work performed by the COMPANY on such materials, machinery and equipment.

13. PERFORMANCE AND CAVITATION GUARANTEES

13.1 Any performance or cavitation guarantees by the COMPANY are set out in this offer and any referenced documents attached hereto.

13.2 The cavitation guarantees shall be valid until expiry of the specified guarantee period or other specified limitations. Provided, however, that the cavitation guarantee shall be voided if it is determined that the CUSTOMER or OWNER has operated the Goods beyond the parameters specified by the COMPANY or under conditions other than as described in the Contract Documents. If notwithstanding the proper operation of the Goods and within the conditions described in the Contract Documents, the Goods exhibit cavitation greater than as guaranteed, the COMPANY shall, at its costs, perform the remedial work as set out in Schedule III, subject to any modification agreed to by the COMPANY, as shall be contained in the Contract Documents.

13.3 The performance guarantees shall be valid until the completion of the specified tests to measure such performance, provided such tests are performed during the delay stipulated therefor. If these tests are not performed within the delays stipulated and, in any event, at the latest 6 months after delivery of the Goods, the performance guarantees shall be deemed to have been achieved unless otherwise agreed in writing by the COMPANY. If the performance guarantees are not achieved upon completion of such tests, the CUSTOMER or OWNER shall give the COMPANY the opportunity to carry out the improvements that the

COMPANY deems necessary, whether or not such improvements are within the original scope of the Work.

The COMPANY may, at its option, instead credit the CUSTOMER or OWNER with the liquidated damages expressly stipulated in Schedule III as compensation for non-fulfilment of the performance guarantees. The CUSTOMER or OWNER shall also be entitled to the said stipulated liquidated damages should the improvements not improve the test results. If the amount of such liquidated damages is set out as a percentage of the Contract Price, for the purpose thereof, the Contract Price shall exclude the costs of any Services, taxes, customs duties, packing or transport expense and additional amounts in excess of the net price of the Goods.

13.4 Unless otherwise expressly agreed by the COMPANY in writing as shall be contained in the Contract Documents, the CUSTOMER and OWNER shall not have any other right, claim or recourse with respect to the cavitation guarantees than the remedial work referred to in section 13.2 and, with respect to the performance guarantees, shall not have any other right, claim or recourse than the said stipulated liquidated damages referred to in section 13.3. The guarantees contained in this Article 13 are the sole guarantees regarding cavitation and performance provided by the COMPANY to the CUSTOMER and OWNER and any other guarantee or warranty implied by law or statute, including, without limitation, fitness for purpose and merchantability, are hereby excluded to the extent such exclusion is not prohibited by mandatory provision of law of public order.

14. **SERVICES**

14.1 To the extent that the Services include technical instruction of employees of the CUSTOMER, its contractors or a third party, such employees nevertheless remain in the employ of and shall report and be responsible only to the CUSTOMER, its contractors or the third party, as the case may be.

14.2 Notwithstanding such supervision, the COMPANY shall not be responsible for any damage caused by such employees nor for any deficiencies or defective work performed by them under the COMPANY's supervision unless and to the extent only that it can be established that such deficiencies or faulty work were directly attributable to gross negligence of the COMPANY's personnel in the course of instruction or supervision.

15. **LIMITATION OF LIABILITY**

15.1 Notwithstanding any other provision contained in the Contract Documents, the maximum liability of the COMPANY for liquidated damages on account of delays in the Contract Time for the performance of the Work (section 7.5) or on account of performance guarantees (section 13.3) shall not exceed, in the aggregate, 10% of the Contract Price, or such other maximum aggregate percentage agreed by the COMPANY in writing as shall form part of the Contract Documents.

15.2 Notwithstanding any other provision of the Contract Documents, and with the exception of liquidated damages referred to in Sections 7.5 and 13.3 of these General Terms and Conditions of Supply, the COMPANY shall not be liable for any indirect or consequential damages whatsoever whether claimed in contract, delict or tort, including, without limitation, loss of profit, loss of revenues or loss of use.

15.3 The COMPANY's maximum liability under this Contract to the CUSTOMER and the OWNER (excluding the liquidated damages referred to in section 15.1 herein above) shall be limited to 20% of the Contract Price or such other percentage of the Contract Price agreed by the COMPANY in writing as shall form part of the Contract Documents. This limit of maximum liability shall not affect available insurance that the COMPANY may be required to subscribe under the Contract Documents.

16. **PATENTS**

16.1 The COMPANY shall indemnify and save the CUSTOMER or OWNER harmless from and against claims for damages or loss which may be made against the CUSTOMER or OWNER on account of alleged infringement of any patent relating to the supply of the Goods hereunder unless such claim is made in respect of equipment, materials, designs, plans or specifications furnished or designated by the CUSTOMER or OWNER, in which case the CUSTOMER and OWNER shall indemnify and save harmless the COMPANY from claims for damages or loss which may be made against it on account of the alleged infringement of any patent by such equipment, materials, designs, plans or specifications.

17. **COMPANY'S RIGHT TO STOP THE WORK OR TERMINATE THE CONTRACT**

17.1 The COMPANY may, without prejudice to its other rights and recourses, terminate the Contract upon notice to the CUSTOMER if:

a) the CUSTOMER or OWNER is adjudged bankrupt, makes a general assignment for the benefit of creditors, avails itself of any other legislation pertaining to bankruptcy or insolvency or if a receiver is appointed to the CUSTOMER or OWNER by reason of its insolvency;

b) The Work is stopped, suspended or otherwise delayed, for a period of 60 days or more, whether by reason of an order of a court or other public authority, a direction of the CUSTOMER or OWNER pursuant to Article 18 or any other reason not attributable to or as a result of fault of the COMPANY;

c) the CUSTOMER is in default to pay the COMPANY amounts of the Contract Price when due or is otherwise in default of its contractual obligations and fails to remedy the default within 5 working days of notice of the COMPANY.

17.2 Notwithstanding termination of the Contract by the COMPANY pursuant to the foregoing, the COMPANY shall nevertheless be entitled to be paid for all Work completed and performed including reasonable profit for loss sustained on the Goods, compensation for commitments to third parties and such other damages as the COMPANY may have sustained as a result of the termination of the Contract.

18. **SUSPENSION OR TERMINATION FOR CONVENIENCE BY THE CUSTOMER/OWNER**

18.1 The CUSTOMER or OWNER shall have the right, without cause, upon written notice to the COMPANY to suspend the performance of the Contract by the COMPANY, subject to the latter's rights to terminate the Contract and be paid the amounts as provided in Article 17. In the event of such suspension, and should the COMPANY elect not to terminate the Contract where the suspension exceeds 60 days, the COMPANY shall be entitled to an increase in the Contract Price to compensate it for any additional costs it shall incur in the performance of the Work as a result of such suspension and shall be entitled to an extension of Contract Time it may require for the performance of the Work due to such suspension, although the required extension may be greater than the period of the suspension.

18.2 The CUSTOMER or OWNER shall have the right, without cause, and upon provision of a 30 day prior written notice to the COMPANY, to terminate the

whole or any portion of the Contract, provided, however, that the CUSTOMER or OWNER shall pay to the COMPANY, in addition to full payment for all Work completed and performed prior to the termination and compensation for expenses incurred by the COMPANY as a result of such termination including all amounts required to settle commitments to third parties, amount representing loss of profit on the Work not completed due to such termination and such other damages as the COMPANY may have sustained as a result of such termination.

19. **ASSIGNMENT AND SUBCONTRACTING**

19.1 Neither party to the Contract shall assign the Contract or a portion thereof without prior written consent of the other, which consent shall not be unreasonably withheld.

19.2 Should the CUSTOMER require, for reasonable cause, a change of a subcontractor proposed by the COMPANY, the COMPANY shall not be required to employ any such subcontractor to whom it may reasonably object and, if the change is implemented, the Contract Price shall be adjusted by the difference in cost and mark-up occasioned by such required change.

20. **APPLICABLE LAW**

20.1 Subject to the provisions of the Contract regarding applicable law, these General Terms and Conditions of Supply shall be interpreted and governed by the laws of the Province of Ontario and the laws of Canada as applicable therein.

21. **CONFIDENTIALITY, OWNERSHIP**: All specifications, drawings, manufacturing data, and other information furnished by Seller to Buyer pursuant to this Proposal or any contract resulting from this Proposal shall, at all times, remain the sole property of Seller, shall be considered for all purposes confidential proprietary information of Seller and shall be deemed to have been transmitted in confidence on the condition that the same are to be held in strict confidence by Buyer and not to be reproduced, copied or used for any purpose, other than in connection with the use of the equipment or goods specified herein, or for any purpose detrimental to Seller.

22. **TERM OF OFFER**: This Proposal shall remain an offer to BUYER for a period of 60 days from the date of issuance. Such date is stated in the Proposal.

SCHEDULES

Schedule I - Contract Specifics (Payment Schedule)

Provided that satisfactory credit is established by Buyer with Seller, payment of the purchase price is due NET Cash thirty (30) days from date of invoice, as follows:

10% -	upon placement of order
10% -	upon 90 days after order
10% -	upon 150 days after order
10% -	upon 210 days after order
10% -	upon 300 days after order
10% -	upon 380 days after order
15% -	upon 410 days after order
15% -	upon 570 days after order
10% -	upon 30 days after date of commercial operation or 6 months after delivery, which ever occurs first

Schedule II - Liquidated Damages

VA TECH HYDRO is receptive to accepting a suitable liquidated damage clause for both late equipment deliveries and for not achieving guaranteed performance levels. The clauses included in the Hatch Acres Technical Specification H-325921.40.01, Special Conditions, however, are not entirely acceptable as written and we suggest further discussions to arrive at mutually agreeable terms.

Schedule III - Cavitation Guarantee

See Proposal Section 4 regarding the Cavitation Guarantee proposed. VA TECH HYDRO will be willing to discuss with the client the possibility of a limited renewal of the guarantee subsequent to any cavitation damage repair and/or modification. However, at this time such a guarantee renewal policy is not offered.

SECTION 10 - EXHIBITS

Turbine Performance Curves

Preliminary Proposal Drawings

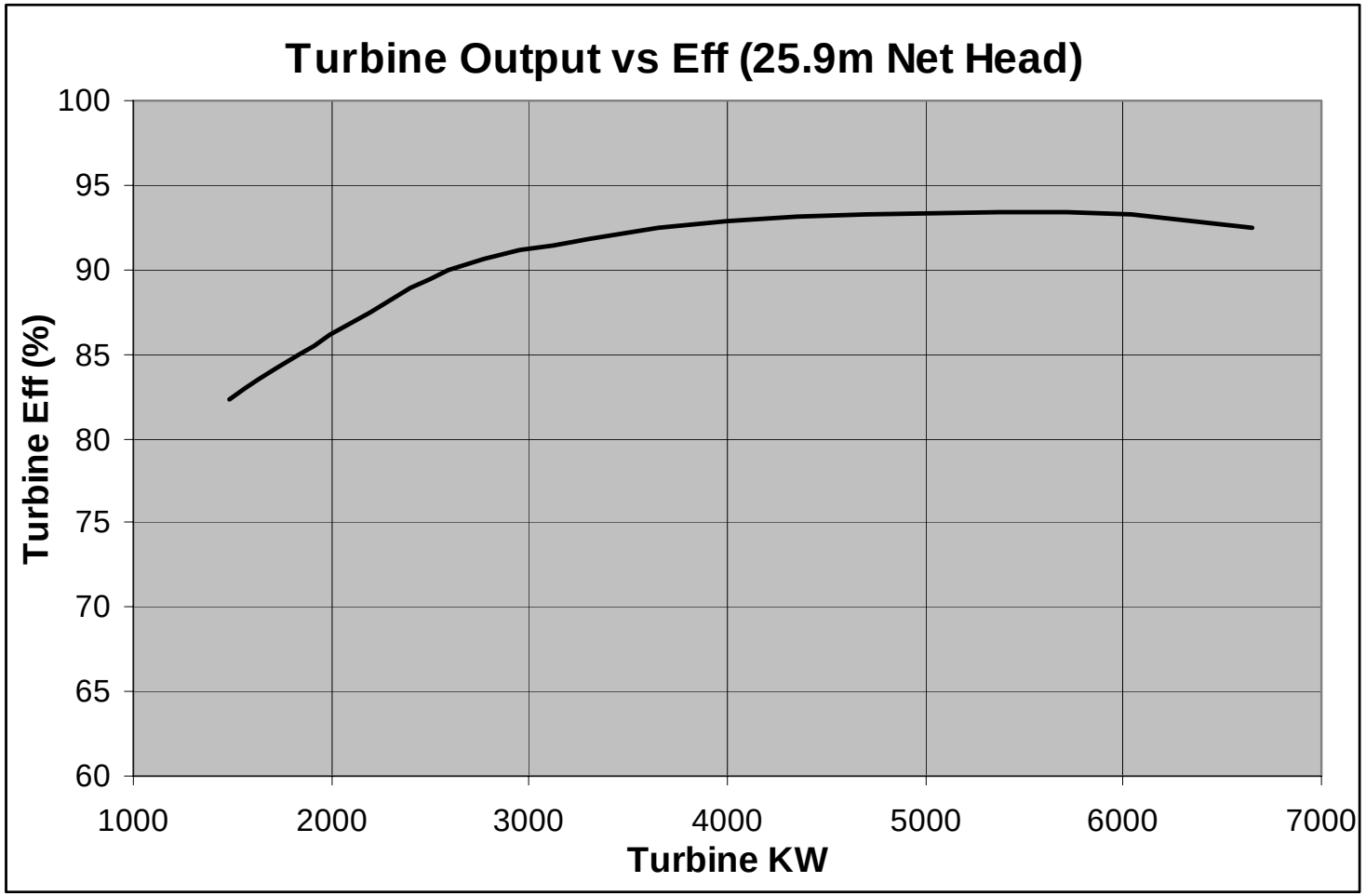
Customer Energy Table with proposed unit performance

VA TECH HYDRO History

Experience Lists

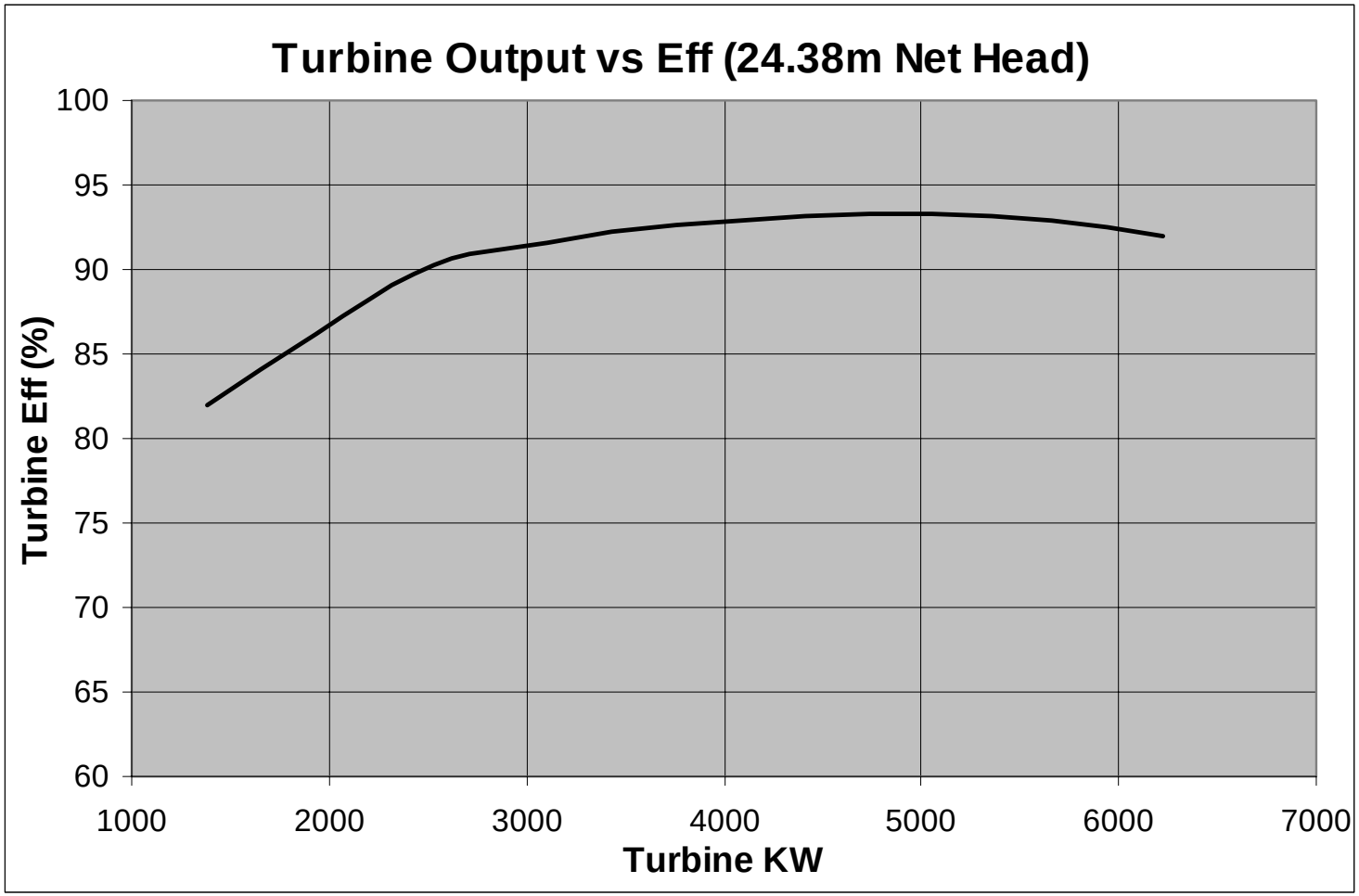
VATECH HYDRO ANDRITZ

Turbine Performance Curves



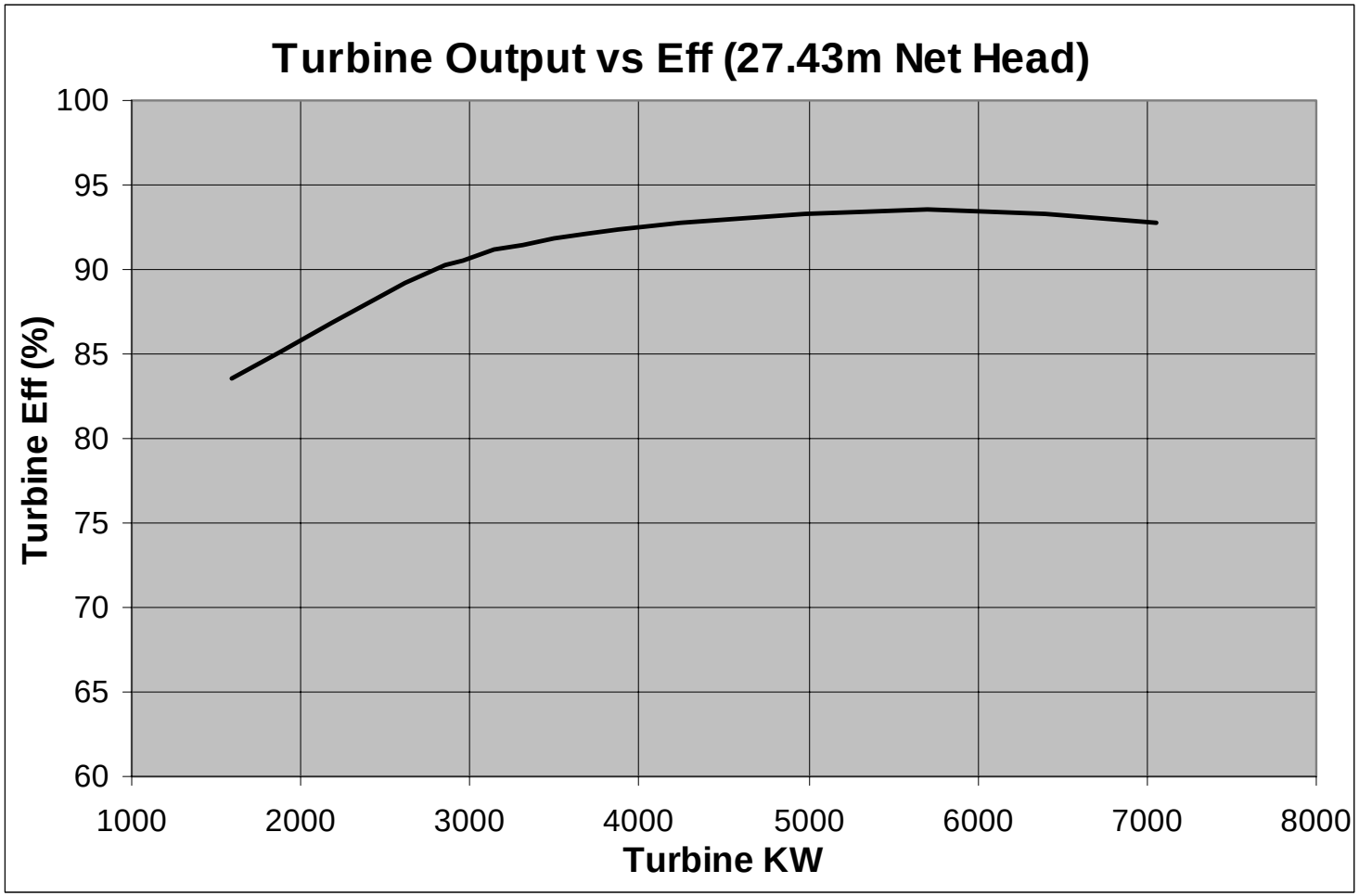
VATECH HYDRO ANDRITZ

Turbine Performance Curves (continued)



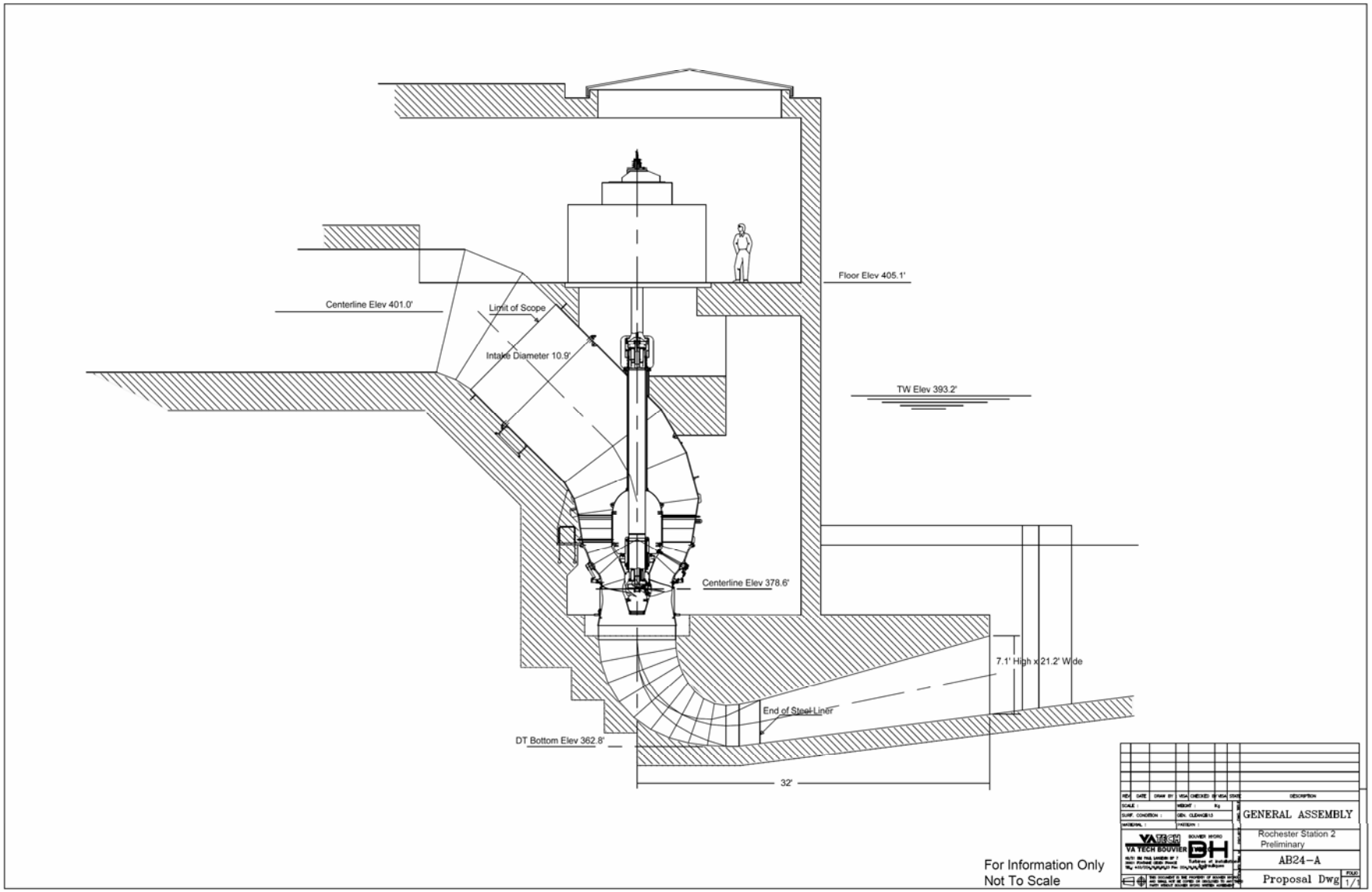
VATECH HYDRO ANDRITZ

Turbine Performance Curves (continued)



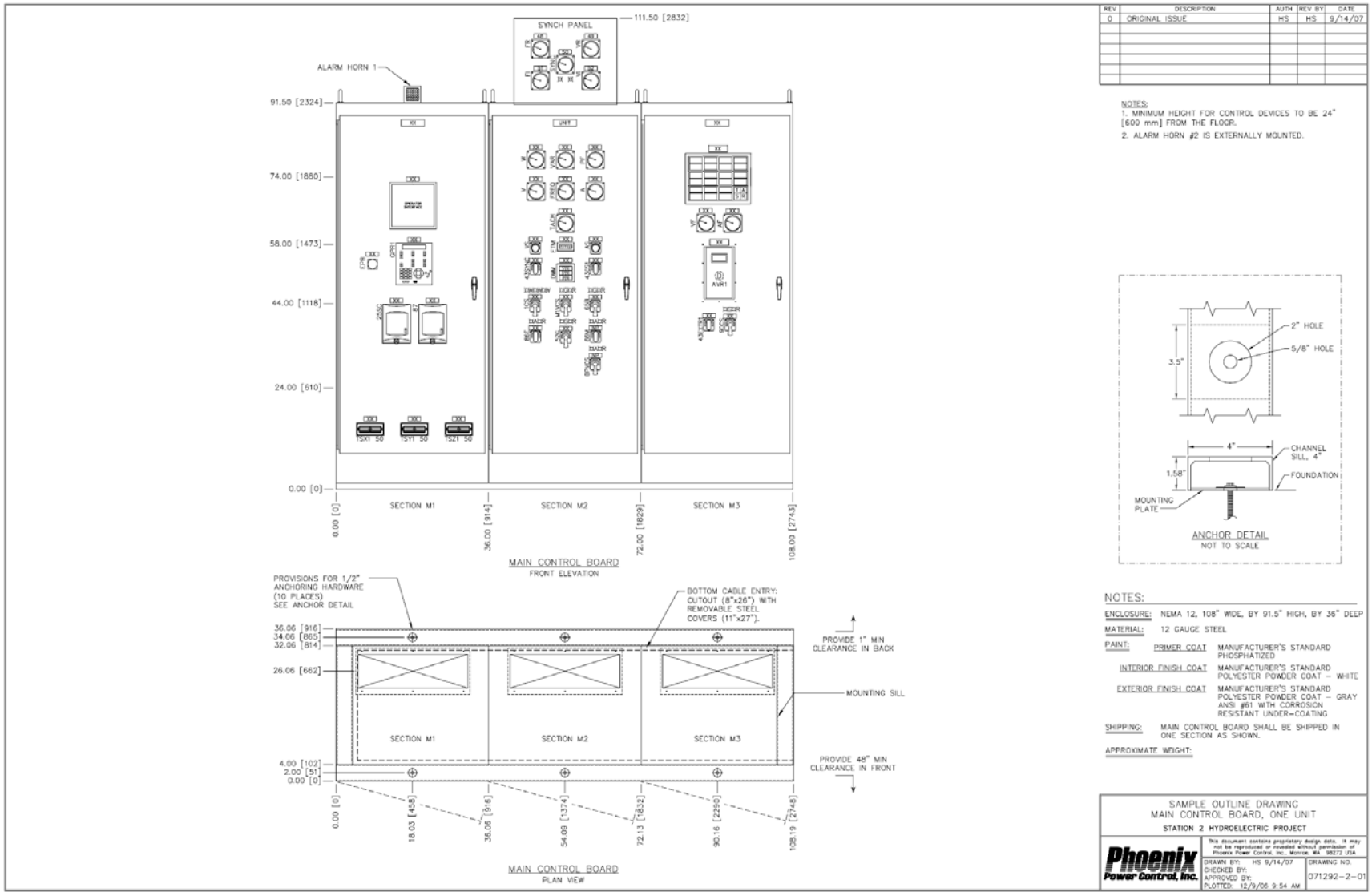
VATECH HYDRO ANDRITZ

Preliminary Arrangement Drawing



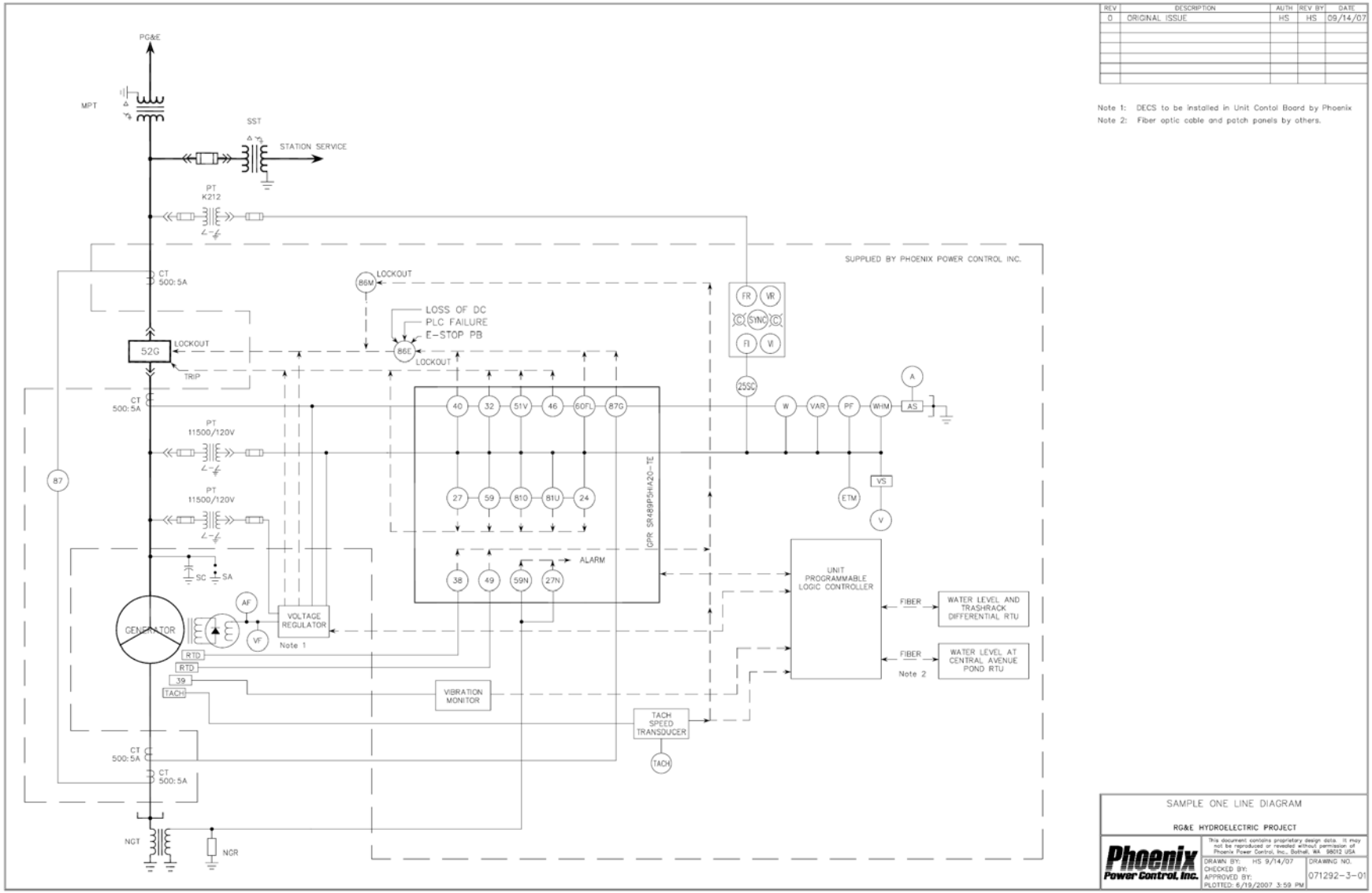
VATECH HYDRO ANDRITZ

Preliminary Control Board Outline Drawing



VATECH HYDRO ANDRITZ

Preliminary One-Line Diagram



VA TECH HYDRO ANDRITZ

Energy Table

TABLE 1
STATION 2 - NEW UNIT
ENERGY TABLE

See instructions at bottom of table

New Unit
- Maximum turbine flow = 1000 cfs at 85 ft net head
- Draft tube exit area = 136 ft^2
- Head loss = 9.0 E-7 * (Qtotal)^2 + 1.48E-06 *(Qunit)^2

New unit maximum flow/(gross head)^0.25 = 323.26 (Kaplan)
New unit maximum flow/(gross head)^0.5 = 104.50 (Francis)

Energy (gross) = 75.28 GWh
Assumed availability = 0.95
Net Generation = **71.52 GWh**

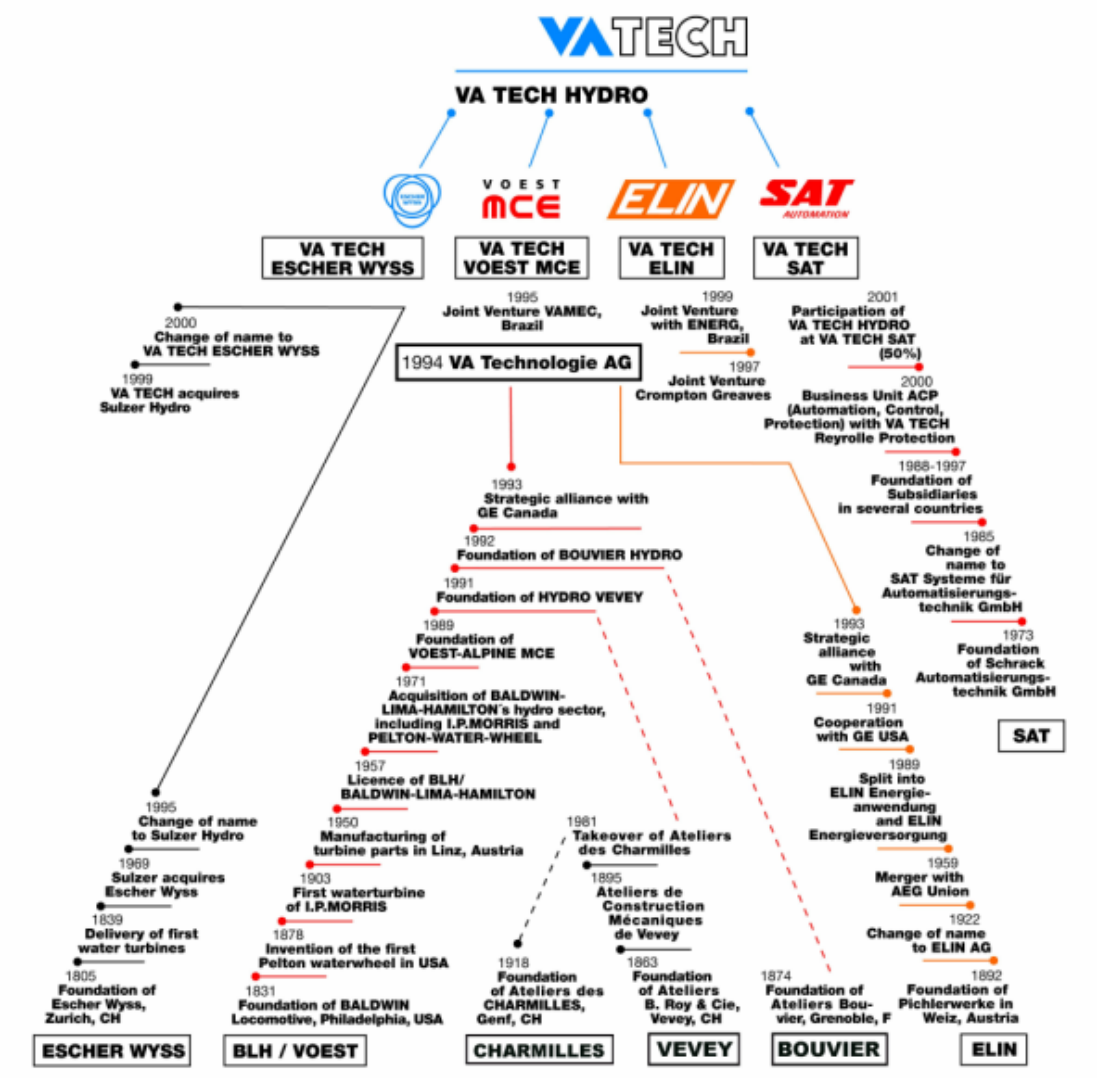
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
					New Unit							Existing Unit				
Pct Exceeded (%)	Available Flow (cfs)	HWL (ft)	TWL (ft)	Gross Head (ft)	Flow (cfs)	Head Loss (ft)	Net Head (ft)	Turbine Efficiency (%)	Turbine Power (MW)	Generator Efficiency (%)	Power (MW)	Flow (cfs)	Power (MW)	Total Power (MW)	P/H Flow (cfs)	Energy (MWh)
100	0	482.60	392.52	90.08	0	0.00	90.08		0.000		0.000	0	0.000	0.000	0	0
95	94	482.60	392.59	90.01	0	0.01	90.00		0.000		0.000	0	0.000	0.000	0	0
90	254	482.60	392.71	89.89	254	0.15	89.74	83.00	1.599	86.30	1.380	0	0.000	1.380	254	302
85	458	482.60	392.85	89.75	458	0.50	89.25	91.40	3.158	95.01	3.001	0	0.000	3.001	458	959
80	559	482.60	392.92	89.68	559	0.74	88.94	92.60	3.892	95.59	3.720	0	0.000	3.720	559	1472
75	661	482.60	392.99	89.61	661	1.04	88.57	93.20	4.613	95.95	4.426	0	0.000	4.426	661	1784
70	781	482.60	393.07	89.53	781	1.45	88.07	93.50	5.437	96.20	5.230	0	0.000	5.230	781	2115
65	918	482.60	393.17	89.43	918	2.01	87.43	93.26	6.328	96.36	6.097	0	0.000	6.097	918	2481
60	1098	482.60	393.29	89.31	963	2.46	86.85	92.50	6.540	96.40	6.305	0	0.000	6.305	963	2716
55	1304	482.60	393.43	89.17	963	2.90	86.27	92.50	6.497	96.39	6.262	0	0.000	6.262	963	2752
50	1550	482.60	393.59	89.01	984	3.59	85.42	92.45	6.569	96.41	6.333	0	0.000	6.333	984	2758
45	1841	482.60	393.77	88.83	1000	4.53	84.30	92.30	6.578	96.41	6.342	841	5.157	11.498	1841	3905
40	2184	482.60	393.98	88.62	1000	5.77	82.85	92.25	6.461	96.39	6.227	1184	7.538	13.766	2184	5533
35	2574	482.60	394.21	88.39	1000	6.62	81.77	92.20	6.374	96.37	6.142	1380	8.165	14.307	2380	6148
30	3060	482.60	394.49	88.11	1000	6.61	81.51	92.20	6.353	96.37	6.122	1378	8.124	14.246	2378	6253
25	3663	482.60	394.81	87.79	1000	6.59	81.19	92.15	6.325	96.36	6.095	1375	8.077	14.172	2375	6224
20	4370	482.60	395.17	87.43	1000	6.58	80.85	92.15	6.298	96.36	6.069	1372	8.025	14.094	2372	6190
15	5430	482.60	395.65	86.95	1000	6.56	80.39	92.10	6.259	96.35	6.031	1368	7.956	13.986	2368	6150
10	7090	482.60	396.27	86.33	1000	6.54	79.79	92.00	6.206	96.34	5.979	1363	7.866	13.844	2363	6095
5	9180	482.60	396.82	85.78	1000	6.52	79.26	92.00	6.164	96.33	5.938	1359	7.785	13.723	2359	6037
0.5	14967	482.60	397.06	85.54	1000	6.51	79.03	91.95	6.143	96.33	5.917	1357	7.751	13.668	2357	5410

Energy (Gross) = **75,284**

Note: In no way does VA TECH HYDRO's submittal of this completed energy Table guarantee that such energy would be available at the site as actual flows and net heads may vary from those listed.
Generator Performance is based on a 0.90 power factor.

VA TECH HYDRO EXPERIENCE

The family of VA TECH Companies includes such firms as Voest-Alpine, Escher Wyss, Vevey, Bouvier, Baldwin-Lima-Hamilton and Pelton Water Wheel. The collective experience of these firms in the design and manufacture of hydraulic turbines is unequalled and goes back to the 1800's. Please refer to the following graphic showing the history of our organization.



Attached with this proposal is an abbreviated copy of the VA TECH HYDRO Propeller turbine experience list.

VA TECH HYDRO ANDRITZ

VA TECH HYDRO Reference List for Compact Propeller Type Units

PLANT	COUNTRY	UNIT	TYPE	(MW)	HEAD (m)	SPEED (rpm)	YEAR	R.DIA (mm)	COMP	PLANT (MW)
Kongsfoss	Norway	1	ACAT	2.9	14.7	333.3	2003	1,770	HDE	2.9
Jettenbach	Germany	2	KRP	2.6	8.8	185.0	2003	2,350	HDE	5.2
Lower Meenmutty	India	2	AT	1.8	15.3	333.3/750	2003	1,650	HIN	3.5
Lower Meenmutty	India	1	AT	0.6	15.3	500.0	2003	1,000	HIN	0.6
Mago B	Norway	1	AK	0.9	7.1	300.0	2003	1,450	HDE	0.9
Rani Avani	India	2	AT	5.5	19.2	214/750	2003	2,600	HIN	11.0
Reichenbach	Germany	1	AR	0.4	3.4	270.0	2003	1,450	HDE	0.4
Rott	Austria	2	KRP	2.6	11.1	205/750	2003	2,350	HDE	5.2
Zevio (57)	Italy	2	KVM	9.6	14.3	136.4	2003	3,500	HIT	19.3
Agonitz	Austria	1	AK	2.5	8.1	187.5	2002	2,350	HDE	2.5
Agonitz HM®	Austria	1	AH	0.6	8.1	428.6	2002	1,120	HAL	0.6
Casnigo	Italy	1	ACAT	1.7	13.0	333.3	2002	1,600	HIT	1.7
Donnas (38)	Italy	2	KVM	4.5	12.9	214.3	2002	2,550	HIT	9.0
Emmenweid	Switzerland	1	AKD	1.1	10.3	166.6	2002	1,450	HDE	1.1
Johannisholm	Sweden	1	AK	1.6	6.3	176.5	2002	2,150	HDE	1.6
Kappelerhof	Switzerland	1	KRP	4.0	6.4	105/750	2002	3,500	HSK	4
Leinau	Germany	1	AK	0.8	7.7	272.7	2002	1,600	HDE	0.8
Nancy	France	1	KV	1.5	5.1	129/1.000	2002	2,600	HFR	1.5
Palomarejo	Spain	2	AK	1.1	3.6	110/750	2002	2,850	HES	2.2
Rheidol	United Kingdom	1	KSVM	1.5	9.0	300.0	2002	1,500	HAL	1.5
Somasila	India	2	KSV	6.4	30.0	272.7	2002	2,150	HIN	12.8
Talavera	Spain	2	AK	1.6	5.2	130/750	2002	2,850	HES	3.2
Tavagnasco 1 (25)	Italy	1	KVWM	2.9	10.5	166.6	2002	2,500	HIT	2.9
Varahi Tailrace	India	3	KSV	8.6	40.0	428.6	2002	1,950	HIN	25.8
Villa Vomano	Italy	1	AT	1.8	6.6	174.1	2002	2,500	HIT	1.8
Arizona Falls	USA	1	KV	0.8	6.0	225/900	2001	1,800	HFR	0.8
Au-Schönenberg 1	Switzerland	1	AKD	0.5	7.0	333.3	2001	1,200	HDE	0.5
Au-Schönenberg 2	Switzerland	1	AKD	1.7	5.9	166.7	2001	2,350	HDE	1.7
Cannelton HM®	USA	140	AH	0.7	6.7	360.0	2001	1,330	HAL	94.2
Hochwuhr	Austria	2	AP	2.2	9.6	239/75	2001	1,950	HDE	4.4

Kakatiya 18th Mile	India	2	AT	0.8	7.6	250/750	2001	1,720	HIN	1.5
Kavarskas	Lituenia	2	AKSG	0.7	6.1	225/750	2001	1,600	HDE	1.4
Letten (44)	Switzerland	2	KVM	2.7	5.3	107.1	2001	3,300	HSK	5.4
Marano	Italy	1	AKD	1.2	8.3	300.0	2001	1,600	HIT	1.2
Nazzano (52)	Italy	1	KVM	6.1	8.5	107.1	2001	3,850	HIT	6.1
Smithland HM®	USA	170	AH	0.5	6.8	360.0	2001	1,250	HAL	90.6
Spilamberto	Italy	1	AKD	0.7	5.5	272.7	2001	1,600	HIT	0.7
Srednogortzi	Bulgaria	1	AP	0.8	7.3	304/750	2001	1,450	HDE	0.8
Steinbach	Austria	2	AR	0.6	2.8	176/500	2001	1,950	HDE	1.2
Vignola	Italy	1	AKD	1.1	7.9	300.0	2001	1,600	HIT	1.1
Widdershausen (93)	Germany	2	APM	0.5	3.0	163/760	2001	1,950	HDE	0.9
Brassilly	France	1	AT	2.7	18.4	428.0	2000	1,500	BH	2.7
Chaskaman	India	1	AT	4.3	18.4	300/750	2000	2,200	EW	4.3
Dietfurt - Bütschwil	Switzerland	1	ACATD	1.0	8.4	300.0	2000	1,450	EW	1.0
Goat Rock	USA	2	KRP	9.9	18.2	229/900	2000	3,000	BH	19.8
Iqbal	India	3	AT	1.3	14.5	375/750	2000	1,400	EW	3.8
Jebel Aulia HM®	Sudan	80	AH	0.4	5.5	375.0	2000	1,000	VA	30.4
Lower Manair	India	2	AK	1.5	9.5	214,3/750	2000	2,100	EW	3.0
Luterbach	Switzerland	1	AKD	0.9	7.2	272.7	2000	1,600	EW	0.9
Niefern	Germany	1	AR	0.3	2.0	175/750	2000	1,700	EW	0.3
Patico	Colombia	1	AK	1.5	11.0	300.0	2000	1,700	VA	1.5
Ponte a Moriano	Italy	2	AFB	0.3	5.5	285/1010	2000	1,350	BH	0.6
Samal	India	5	AT	4.7	10.2	168,5/750	2000	2,800	EW	23.7
Sao Joaquim	Brazil	3	ACAT	2.9	17.2	400.0	2000	1,600	EW	8.7
Soor - Bütschwil	Switzerland	1	ACATD	1.0	8.6	300.0	2000	1,450	EW	1.0
Talmühle	Germany	1	AP	0.3	4.2	295/750	2000	1,200	EW	0.3
Truchtlaching	Germany	1	AR	0.4	2.1	144/600	2000	1,950	EW	0.4
Tübinger Strasse	Germany	2	AP	0.7	5.6	254/750	2000	1,450	EW	1.3
Vajra	India	1	AT	3.5	15.0	241/750	2000	2,200	EW	3.5
Vale do Gaio 2	Portugal	1	ACAT	1.1	25.0	500.0	2000	1,000	EW	1.1
Wushantou	Taiwan	1	KV	9.0	24.1	300.0	2000	2,350	VA	9.0
Agnoor	India	2	AT	0.5	3.0	153/750	1999	2,200	EW	1.0

						0				
Antonecchia	Italy	2	AKB	0.4	9.0	488.0	1999	1,000	EW	0.8
Beznau Wehr	Switzerland	1	KRP	6.0	6.4	112.0	1999	4,000	EW	6.0
Caneiro	Portugal	1	AT	1.6	11.7	300.0	1999	1,600	BH	1.6
Moulin Bertrand	France	1	AI	1.6	12.0	300/1000	1999	1,600	BH	1.6
Tawnawully	Ireland	1	AT	0.5	19.5	750.0	1999	800	BH	0.5
Antonsthal	Germany	1	ATD	0.6	16.0	600.0	1998	800	BH	0.6
Cainsdorf/98	Germany	1	AP (KRT)	0.5	3.5	196/600	1998	1,700	EW	0.5
Capdenac	France	1	AIB	2.1	5.1	120/750	1998	3,200	BH	2.1
Freudenau Matrix	Austria	25	AMT	0.2	6.8	500.0	1998	920	VA	5.0
Pierre Benite	France	2	ATD	3.8	8.3	140/750	1998	3,200	BH	7.6
Sao Gabriel	Brasil	4	ATD	1.4	11.7	350.0	1998	1,400	BH	5.7
Cachoiera Schönheide	Germany	1	ATD	0.2	5.1	500.0	1998	800	BH	0.2
Sucati	Turkey	2	ATD	4.8	34.9	500.0	1998	1,500	VA/BH	9.5
Bhoothatan Kettu	India	4	AT	5.6	12.0	170/750	1997	2,800	EW	22.4
Harangi	India	2	AT	4.6	21.2	300/750	1997	2,200	EW	9.3
Hemavathy (Dam Toe)	India	4	AT	4.6	21.2	272.7	1997	2,200	EW	18.5
Linden	Germany	1	ATD	0.3	9.3	500.0	1997	800	VA/BH	0.3
Martinszell	Germany	1	AP (KRT)	0.4	2.2	165/600	1997	1,950	EW	0.4
Seesperre	Austria	1	APD	1.0	5.6	199/750	1997	1,900	VA/BH	1.0
Witaschdorf	Germany	1	AP (KRT)	0.4	3.8	243/600	1997	1,450	EW	0.4
Leisnig	Germany	2	AP (KRT)	0.3	1.9	138/600	1996	1,950	EW	0.6
Pfaffensprung	Switzerland	1	ATD	0.7	19.5	750.0	1996	800	BH	0.7
Atzenbach	Germany	1	AP (KRT)	0.7	12.5	510/1000	1995	1,000	EW	0.7
Cainsdorf/95	Germany	1	AP (KRT)	0.5	3.2	204/750	1995	1,700	EW	0.5
Diemlach	Austria	2	APD	3.1	8.6	237/752	1995	1,702	VA	6.1
Interlaken	Switzerland	1	APD	0.3	2.4	156/600	1995	1,700	HV	0.3
Lunzenau	Germany	2	AP (KRT)	0.4	3.4	220/750	1995	1,450	EW	0.7
Mühlbach	Germany	1	AP (KRT)	0.2	1.8	142/750	1995	1,700	EW	0.2
Sigmaringen	Germany	1	AP (KRT)	0.3	2.0	160.0	1995	1,700	EW	0.3
Windsor	Canada	5	AIB	1.2	5.4	170/900	1995	2,240	BH	5.9
Zlatten	Austria	1	AP (KRT)	0.9	11.5	382/750	1995	1,350	EW	0.9
Amsteg	Switzerland	2	APD	1.0	4.3	196/750	1994	1,900	HV	1.9
Apas	France	1	AFB	0.8	7.5	250/750	1994	1,700	BH	0.8
Bettmannsäge	Germany	1	AP (KRT)	0.2	2.3	250/760	1994	1,200	EW	0.2

Dreisam	Germany	1	AP (KRT)	0.3	4.1	286/1010	1994	1,200	EW	0.3
Fisching T3	Austria	1	AT	3.2	23.5	600.0	1994	1,400	EW	3.2
Hirten	Germany	1	AP (KRT)	0.2	4.1	339/760	1994	1,000	EW	0.2
Jubiläumswerk	Austria	2	APD	1.0	5.5	250/750	1994	1,700	VA	2.0
Juncalito	Chile	1	AP (KRT)	1.5	12.5	370/750	1994	1,450	EW	1.5
Nalbach-Wehr	Germany	1	AP (KRT)	0.4	4.1	230/750	1994	1,450	EW	0.4
Nalbach-Wehr	Germany	1	AP (KRT)	0.4	4.1	230/750	1994	1,450	EW	0.4
Schopfheim	Germany	1	AP (KRT)	0.2	3.3	334/750	1994	1,000	EW	0.2
Schwellöd	Austria	2	APD	0.9	6.4	230/750	1994	1,700	VA	1.7
Snare Cascades	Canada	1	AT	4.5	9.1	133.3	1994	3,200	EW	4.5
Sonthofen	Germany	1	AP (KRT)	0.3	5.6	382/760	1994	1,000	EW	0.3
Urbach	Germany	1	AP (KRT)	0.2	3.5	305/760	1994	1,000	EW	0.2
Buffalo	USA	1	AIB	0.3	10.3	600.0	1993	800	BH	0.3
Deer Island	USA	2	APD	1.1	8.5	340/900	1993	1,500	BH	2.2
Dornachbrugg	Switzerland	2	APD	0.8	9.0	361/750	1993	1,320	VA/HV	1.6
Marches Naturelles	Canada	1	AV	4.2	18.5	300.0	1993	2,000	BH	4.2
Molinos	Argentina	2	AP (KRT)	0.9	4.4	192/750	1993	1,950	EW	1.8
Mooshausen	Germany	1	AP (KRT)	0.5	5.9	348/750	1993	1,200	EW	0.5
Seon 2	Switzerland	1	AP (KRT)	0.2	8.6	500/750	1993	800	EW	0.2
Sunsari	Norway	2	AP (KRT)	1.6	6.6	165/750	1993	2,250	EW	3.3
Widdershausen	Germany	2	AP (KRT)	0.5	3.0	163/760	1993	1,950	EW	1.1
Big Chute	Canada	1	AT	11.2	17.7	180.0	1992	3,200	EW	11.2
East Angus	Canada	3	AIB	0.8	5.9	192/900	1992	2,000	BH	2.4
Frankford	Canada	4	AP (KRT)	1.2	5.7	186/720	1992	1,950	EW	4.6
Langweid	Germany	3	AP (KRT)	1.8	7.5	191/750	1992	2,100	EW	5.5
Pagade	Portugal	1	AT	1.7	15.0	375/750	1992	1,600	BH	1.7
Peneda	Portugal	1	AFB	0.5	7.7	375/1000	1992	1,350	BH	0.5
Pournari II	Greece	1	AT	2.1	7.3	200.0	1992	2,200	EW	2.1
Riviere del Est	France	1	AV	1.3	23.4	600.0	1992	1,060	BH	1.3
Semitropic	USA	1	AT	1.3	16.8	450.0	1992	1,180	BH	1.3
Seymour	Canada	5	AP (KRT)	1.3	7.6	218/720	1992	1,950	EW	6.5
Sidney	Canada	4	AP (KRT)	1.3	6.2	205/720	1992	1,950	EW	5.0
Thun II	Switzerland	1	AT	2.8	7.1	144/1000	1992	2,800	EW	2.8
Weidachmühle	Germany	1	AP (KRT)	0.8	4.0	179/750	1992	1,950	EW	0.8
Weißenbach	Austria	1	AT	0.6	24.7	1000,0	1992	670	VA	0.6

Winooski One	USA	3	AP (KRT)	2.6	11.0	256/720	1992	1,950	EW	7.9
Ecay	Spain	1	AP (KRT)	0.7	5.2	234/1000	1991	1,700	EW	0.7
La Meuniere	Switzerland	1	AP (KRT)	0.3	7.0	386/756	1991	1,000	EW	0.3
Nofuentes	Spain	2	AFB	0.2	3.8	284/1000	1991	1,200	BD	0.4
Ponts	Spain	1	AFB	0.4	6.1	297/1000	1991	1,350	BD	0.4
Retznei	Austria	1	APD	0.9	5.8	194/750	1991	1,900	VA	0.9
Schlossmühle	Germany	1	AP (KRT)	0.6	2.8	102/600	1991	2,600	EW	0.6
Tachterting	Germany	1	AP (KRT)	0.4	5.3	343/750	1991	1,200	EW	0.4
Brigl	Austria	1	AP (KRT)	0.9	6.1	220/750	1990	1,700	EW	0.9
Clanezzo	Italy	1	AT	2.5	22.7	381,6/750	1990	1,650	EW	2.5
El Sifon	Spain	2	AP (KRT)	0.8	15.3	420.0	1990	1,200	EW	1.5
Eisenfurt	Germany	1	AP (KRT)	0.2	3.4	278/758	1990	1,200	EW	0.2
Göppingen	Germany	1	AP (KRT)	0.3	4.3	304/760	1990	1,200	EW	0.3
Mühlbach	Italy	1	AT	0.6	27.1	1000,0	1990	670	VA	0.6
Swift Rapids 1 &2 U 3	Canada	2	AT	2.6	14.2	277.0	1990	1,959	EW	5.2
Swift Rapids 3 U 3	Canada	1	AT	2.8	14.2	277.0	1990	2,032	EW	2.8
Vigevano	Italy	1	AT	3.3	18.4	302,4/750	1990	1,900	EW	3.3
Welsberg	Italy	1	AT	0.6	14.1	500,0	1990	1,060	VA	0.6
Wendlingen	Germany	1	AP (KRT)	0.6	3.2	173.5	1990	1,950	EW	0.6
Altenstadt	Germany	2	AP (KRT)	0.2	6.0	176,5/750	1989	1,000	EW	0.5
Babail *	India	2	AT	1.6	7.2	202/750	1989	2,240	VA	3.2
Ballisodare 1	Ireland	1	AP (KRT)	0.6	5.7	277/758	1989	1,450	EW	0.6
Ballisodare 2	Ireland	1	AP (KRT)	0.6	5.1	277/758	1989	1,450	EW	0.6
Ballisodare 3	Ireland	1	AP (KRT)	0.9	7.9	290/758	1989	1,450	EW	0.9
Belka *	India	2	AT	1.6	5.7	162/750	1989	2,500	VA	3.2
Brückenmühle	Germany	1	AP (KRT)	0.1	2.5	286/755	1989	1,000	EW	0.1
Cameron Falls*	Canada	1	AT	4.4	15.8	240,0	1989	2,240	VA	4.4
Carmichael Falls	Canada	2	AT	9.5	15.5	163.6	1989	3,200	EW	19.1
Carturo	Italy	2	AT	2.0	7.5	191,9/750	1989	2,200	EW	3.9
Fisching-Wehrturbine	Austria	1	AP (KRT)	2.0	11.1	315,8/750	1989	1,700	EW	2.0
Herrentoebeli	Switzerland	2	AP (KRT)	0.5	9.5	472,1/1000	1989	1,000	EW	0.9
Krün	Germany	1	AP (KRT)	0.2	5.9	403/750	1989	1,000	EW	0.2
Pöls I	Austria	1	AT	1.8	24.6	600,0	1989	1,060	VA	1.8
Pöls II	Austria	1	AT	1.3	19.5	600,0	1989	1,060	VA	1.3
Ragged Chute	Canada	1	AT	6.9	14.0	171.4	1989	3,200	EW	6.9

Aldingen	Germany	2	AP (KRT)	0.6	3.4	170/750	1988	1,950	EW	1.2
Enzberg II	Germany	2	AP (KRT)	0.2	4.1	293,3/760	1988	1,200	EW	0.4
Fonderia	Italy	2	AP (KRT)	0.6	7.1	307/761	1988	1,450	EW	1.3
Fourneaux	France	1	AFB	0.4	6.0	300.0	1988	1,350	BD	0.4
Grazerwehr	Austria	1	APD	1.1	5.8	220/750	1988	1,900	VA	1.1
Hohenbrugg	Austria	1	AP (KRT)	0.4	5.3	295/1000	1988	1,200	EW	0.4
Hönigtal	Austria	1	APD	2.0	10.6	235/750	1988	1,900	VA	2.0
Jennersdorf	Austria	1	APD	0.3	3.0	240/1000	1988	1,320	VA	0.3
Manching	Germany	1	AP (KRT)	0.2	2.1	192/750	1988	1,450	EW	0.2
Moretown	USA	1	AP (KRT)	1.3	10.7	351/720	1988	1,450	EW	1.3
Rottenburg	Germany	2	AP (KRT)	0.5	5.2	260/750	1988	1,450	EW	1.0
St. Marein / Trieb	Austria	1	APD	1.2	6.0	220/750	1988	1,900	VA	1.2
Wetzmann II	Austria	1	AP (KRT)	0.6	11.6	545,5/1000	1988	1,000	EW	0.6
Allersdorf	Austria	1	AT	1.7	11.9	270/1000	1987	1,700	VA	1.7
Blatten	Switzerland	1	AP (KRT)	0.4	3.9	192,8/760	1987	1,700	EW	0.4
Deuchendorf	Austria	1	AP (KRT)	1.3	6.4	210/750	1987	1,950	EW	1.3
Horster Mühle	Germany	4	AP (KRT)	0.6	4.3	158/600	1987	1,950	EW	2.6
Hürlimann	Switzerland	1	AP (KRT)	0.3	4.6	302,4/750	1987	1,200	EW	0.3
Kehrbach	Austria	1	AP (KRT)	0.2	4.3	295/100	1987	1,200	EW	0.2
Kindberg	Austria	1	APD	2.0	10.5	235/750	1987	1,900	VA	2.0
Landquart	Switzerland	1	AP (KRT)	0.8	12.1	447/1000	1987	1,200	EW	0.8
Lienz	Switzerland	1	AP (KRT)	0.4	4.3	192,8/760	1987	1,700	EW	0.4
Lorente	Spain	1	AT	0.7	7.1	300/750	1987	1,400	EW	0.7
Mittlere Mürz 1	Austria	7	AP (KRT)	0.6	3.5	170/750	1987	1,950	EW	3.5
Mittlere Mürz 2	Austria	2	AP (KRT)	0.9	4.2	200/750	1987	1,950	EW	1.6
Montlingen	Switzerland	1	AP (KRT)	0.4	3.8	192,8/760	1987	1,700	EW	0.4
Mürzhofen	Austria	1	APD	1.4	6.7	220/750	1987	1,900	VA	1.4
Stubenberg	Austria	1	AP (KRT)	0.6	8.9	420/1000	1987	1,200	EW	0.6
Widen	Switzerland	1	AP (KRT)	0.8	5.2	182,3/750	1987	1,950	EW	0.8
Benton Falls 1	USA	1	AP (KRT)	0.8	9.5	412/900	1986	1,200	EW	0.8
Chalet 2	Switzerland	1	ATB	1.4	13.8	360.0	1986	1,420	VE	1.4

Deutenham	Austria	2	AP (KRT)	1.7	9.7	256/750	1986	1,950	EW	3.3
Forestport	USA	1	AT	3.9	18.1	327.3	1986	1,900	EW	3.9
Kainach	Austria	1	APD	0.6	4.4	195/750	1986	1,700	VA	0.6
Lamuzola *	Spain	1	AV	1.8	22.0	500.0	1986	1,250	VE	1.8
Lewisville	USA	1	AP (KRT)	3.2	23.2	360.0	1986	1,650	EW	3.2
Mühl	Austria	1	AT	0.9	6.0	231/750	1986	1,700	VA	0.9
Neudorf	Austria	1	APD	0.4	2.8	169/750	1986	1,700	VA	0.4
Ogdensburg	USA	5	AP (KRT)	0.8	4.3	177/720	1986	1,950	EW	4.0
Pugal 1	India	1	AT	1.6	10.6	274/750	1986	1,900	EW	1.6
Pugal 2	India	1	AT	0.7	6.3	208/750	1986	1,900	EW	0.7
Rive d'Arcano	Italy	1	AT	1.8	12.5	290/1000	1986	1,650	EW	1.8
Springfield	USA	1	AP (KRT)	0.5	6.7	345/910	1986	1,200	EW	0.5
Town Bluff Dam	USA	2	AT	3.6	10.7	163.6	1986	2,800	EW	7.2
Lockwood	USA	1	AT	2.0	6.4	144.0	1985	2,800	EW	2.0
Matzing	Germany	1	AP (KRT)	0.1	2.8	277/760	1985	1,000	EW	0.1
N'Sangui	Zaire	2	AIB	0.3	16.0	750.0	1985	710	BD	0.6
Philadelphia	USA	1	AT	3.6	16.6	300,0	1985	1,900	VA	3.6
Rohti *	India	2	AT	0.4	2.9	153/750	1985	2,000	VA	0.8
Stratos	Greece	2	AT	3.4	16.8	300,0	1985	1,900	VA	6.8
Thuhi *	India	2	AT	0.4	2.9	153/750	1985	2,000	VA	0.8
Turgi	Switzerland	1	AT	1.1	3.0	106/1000	1985	2,800	EW	1.1
Alfajes *	Spain	1	ATB	1.1	11.5	428.6	1984	1,250	VE	1.1
Barton Dam	USA	1	AF	1.0	7.2	216/900	1984	1,800	VA	1.0
Biberist	Switzerland	1	AP (KRT)	0.5	4.3	200/750	1984	1,700	EW	0.5
Fladenhofenhöhe	Austria	1	AT	1.1	10.8	360/1000	1984	1,400	EW	1.1
Hals	Germany	1	AP (KRT)	1.0	6.8	253/750	1984	1,700	EW	1.0
Iller VIII	Germany	1	AP (KRT)	1.6	8.4	239/760	1984	1,950	EW	1.6
Kakroi	India	1	ASB	0.1	1.9	193/600	1984	1,400	VA	0.1
Kleinmünchen	Austria	1	AT	1.5	4.7	150/1000	1984	2,500	VA	1.5
La Cueva *	Spain	1	ATB	1.2	13.4	428.6	1984	1,250	VE	1.2
L'Atmella de Merola *	Spain	1	APB	1.2	15.8	428.6	1984	1,250	VE	1.2
Little Falls	USA	2	AT	7.4	13.4	180/720	1984	3,200	EW	14.7
Madera 1174	USA	1	AT	0.6	4.3	230/910	1984	1,700	VA	0.6
Madera 1302	USA	1	AT	0.5	9.5	435/910	1984	1,000	VA	0.5
Madera 1923	USA	1	AT	1.0	7.9	282/910	1984	1,700	VA	1.0
Neuenbürg	Germany	1	AP (KRT)	0.3	4.3	285/760	1984	1,200	EW	0.3
Stevens Mills	USA	1	AT	2.0	10.1	225/900	1984	1,900	EW	2.0
Superior Dam	USA	1	AI	0.8	4.9	185/900	1984	1,900	VA	0.8
Tallasee	USA	1	AT	2.2	12.0	257.1	1984	1,900	EW	2.2
Wasendorf	Austria	2	AT	1.2	19.6	600,0	1984	1,000	VA	2.4
Anoopgarh	India	3	AT	1.6	9.5	252/750	1983	1,900	EW	4.8
Coderno	Italy	1	AT	2.0	25.1	500/1000	1983	1,400	EW	2.0
Diana	USA	1	AT	1.9	12.3	360.0	1983	1,650	EW	1.9
Dolgeville	USA	1	AT	6.8	23.6	327.3	1983	2,200	EW	6.8

Gantt	USA	1	AF	1.9	8.0	200,0	1983	2,240	VA	1.9
Hinckley	USA	2	AT	4.7	19.8	257.1	1983	2,200	EW	9.4
Hüttenmühle	Austria	1	AF	0.9	6.8	250/750	1983	1,750	VA	0.9
La Croux	France	1	AVB	1.1	12.7	428.6	1983	1,350	BD	1.1
Landsberg	Germany	1	AP (KRT)	0.5	5.4	212/760	1983	1,700	EW	0.5
Madera 980	USA	1	AT	1.9	8.8	277,0	1983	1,900	VA	1.9
Maquatua	Canada	1	AT	1.2	11.5	327.0	1983	1,400	EW	1.2
Matte	Switzerland	1	AT	1.1	3.2	100/1000	1983	3,200	EW	1.1
Monte Fortin	Italy	1	AT	2.4	13.8	285/1000	1983	1,900	EW	2.4
Murau	Austria	1	AT	2.0	9.4	220/1000	1983	2,200	EW	2.0
Pforzheim	Germany	2	AP (KRT)	0.5	5.5	262/760	1983	1,450	EW	1.0
Reismühle	Germany	1	AP (KRT)	0.1	2.3	214/760	1983	1,200	EW	0.1
Steinen	Germany	2	AP (KRT)	0.5	7.3	365/760	1983	1,200	EW	0.9
Tanneron 1	France	1	AV	2.6	12.6	272.7	1983	1,975	BD	2.6
Tanneron 2	France	1	AVB	0.2	12.6	1000.0	1983	540	BD	0.2
Zwiesel	Germany	1	AP (KRT)	0.2	3.1	203/760	1983	1,450	EW	0.2
Eastmann Falls	USA	1	AT	4.3	10.1	160/900	1982	3,200	EW	4.3
Föhlschmitten	Germany	1	AP (KRT)	0.3	6.5	410/765	1982	1,000	EW	0.3
Kesselstadt	Germany	2	AT	2.4	3.5	73,7/750	1982	4,450	EW	4.8
l'Arve	France	2	AVB	2.1	14.0	350/1000	1982	1,700	BD	4.2
Marshall	USA	2	AI	3.5	11.0	212/720	1982	2,500	VA	7.0
North Hartland	USA	1	AV	4.2	20.0	360,0	1982	1,800	VA	4.2
Offenbach	Germany	2	AT	2.1	3.0	73,7/750	1982	4,450	EW	4.1
Rians	France	2	APB	0.1	5.7	500/1000	1982	800	BD	0.2
Siegsdorf	Germany	1	AP (KRT)	0.3	6.5	410/760	1982	1,000	EW	0.3
Weissenegg	Austria	1	AT	0.8	7.3	317,5/1000	1982	1,400	EW	0.8
Werndorf	Austria	1	AT	0.6	7.2	317,5/1000	1982	1,400	EW	0.6
Bätterkinden	Switzerland	1	AT	0.4	4.1	198,9/1007	1981	1,650	EW	0.4
Blackstone	USA	2	AI	0.8	5.0	200/720	1981	1,900	VA	1.6
Fourth Lake	Canada	1	AT	3.1	22.7	360/360	1981	1,650	EW	3.1
Hagerhüsli	Switzerland	1	AT	0.6	5.7	226,6/1007	1981	1,650	EW	0.6
Netstal	Switzerland	1	AT	0.8	4.6	160/1000	1981	2,200	EW	0.8
Oyan River	Nigeria	3	AV	3.2	18.9	375.0	1981	1,730	VE	9.6
Patillas	Puerto Rico	2	AV	0.8	31.4	900,0	1981	710	VA	1.6
Botto di Botto	Italy	1	AVB	0.2	7.5	600.0	1980	800	BD	0.2
Clechet	France	2	AVB	0.7	15.5	600.0	1980	1,000	BD	1.4
Pers	Italy	2	ATB	0.7	3.5	155/750	1980	2,200	EW	1.3
Pineda	Italy	1	ATB	0.8	4.0	155/750	1980	2,200	EW	0.8
San Pedro	Ivory Coast	2	AT	2.6	9.8	275.0	1980	2,050	VE	5.2
Weinzödl	Austria	1	AT	0.2	2.3	161/1013	1980	1,650	EW	0.2
Perlen	Switzerland	1	AT	1.1	2.7	100/1000	1979	3,200	EW	1.1
Nepes	France	1	AVB	2.8	12.2	250.0	1977	2,200	BD	2.8

Heimbach Wehr	Germany	1	AP (KRT)	0.8	8.0	289/1000	1975	1,450	EW	0.8
Kappelerhof	Switzerland	1	ATB	2.8	5.1	86.3	1974	3,650	VE?	2.8
Huamali	Peru	2	AP (KRT)	0.4	9.1	460/600	1968	1,000	EW	0.9
Kettershausen	Germany	1	AP (KRT)	0.3	5.0	300/760	1968	1,200	EW	0.3
Wunderklingen	Switzerland	1	AP (KRT)	0.4	9.0	425/1000	1967	1,000	EW	0.4
Linthal	Switzerland	1	AT	0.7	12.0	375/375	1966	1,150	EW	0.7
Ennenda	Switzerland	1	AT	0.1	2.6	185/1000	1963	1,300	EW	0.1
Ennenda	Switzerland	1	ATB	0.1	2.6	185/1000	1963	1,300	EW	0.1
Leitzach III	Germany	2	AP (KRT)	0.4	4.8	253/760	1963	1,350	EW	0.8
Mühlacker	Germany	2	AP (KRT)	0.4	4.6	232/770	1963	1,450	EW	0.8
Tamayado	Japan	1	AP (KRT)	4.4	16.8	300/300	1963	1,950	EW	4.4
Thurnsdorf	Austria	1	AP (KRT)	0.9	10.3	375/375	1962	1,300	EW	0.9
Herrfors	Finland	1	AP (KRT)	0.4	4.0	165/60	1961	1,800	EW	0.4
Untereggingen	Germany	1	AP (KRT)	0.2	3.5	248/750	1960	1,200	EW	0.2
Vittorio-Veneto	Italy	1	AT	0.2	4.2	274/1000	1960	1,125	EW	0.2
Weilheim	Germany	1	AP (KRT)	0.6	4.4	186/600	1960	1,800	EW	0.6
Arlen	Germany	2	AP (KRT)	0.3	4.6	265/750	1959	1,200	EW	0.6
Maseris	Italy	1	AT	0.4	6.5	300/300	1959	1,275	EW	0.4
Finsing	Germany	1	AP (KRT)	0.7	8.7	345/345	1958	1,300	EW	0.7
Villigst	Germany	2	AT	0.8	3.9	125/1000	1958	2,450	EW	1.6
Ravensburg II	Germany	1	AP (KRT)	0.1	4.2	300/1000	1957	1,000	EW	0.1
Villagonzalo	Spain	2	ATW	0.2	2.2	136,3/750	1952	1,845	EW	0.4
Arzignano	Italy	1	AT	0.0	3.5	467/125	1949	575	EW	0.0
Blankenstein	Germany	4	ATW	0.3	3.0	149/1150	1948	1,845	EW	1.1
Blankenstein	Germany	2	ATW	0.3	3.0	149/1200	1948	1,845	EW	0.5
Brebbia	Italy	1	AT	0.1	4.5	346/1000	1947	900	EW	0.1
Macello-Treviso	Italy	2	ATW	0.6	2.8	90,9/1000	1947	2,800	EW	1.2
S. Giustina	Italy	1	ATW	0.1	3.2	257/630	1946	1,025	EW	0.1
Turbenthal	Switzerland	1	AT	0.1	4.9	500/500	1946	700	EW	0.1
Coseano	Italy	1	ATW	0.1	1.6	115,4/840	1945	1,675	EW	0.1
Wolhusen	Switzerland	1	AT	0.1	2.1	177,5/1000	1945	1,250	EW	0.1
Leuggelbach	Switzerland	1	ATW	0.0	4.0	620/1000	1944	500	EW	0.0
Glarus	Switzerland	1	AT	0.0	1.4	190/1000	1943	1,000	EW	0.0
Linsenthal	Switzerland	1	AT	0.3	5.7	383/1000	1942	1,100	EW	0.3
Frauenfeld	Switzerland	1	ATW	0.0	1.5	175/1045	1941	950	EW	0.0
Glarus	Switzerland	1	ATW	0.1	3.8	250/250	1941	950	EW	0.1
Kägiswil	Switzerland	1	AT	0.1	2.9	202/750	1941	1,100	EW	0.1
Vicenza	Italy	1	ATW	0.1	2.7	268/630	1940	1,025	EW	0.1

Wolhusen	Switzerland	1	AT	0.1	2.8	175.0	1940	1,100	EW	0.1
Oderzo	Italy	1	ATW	0.1	1.8	189/305	1939	1,200	EW	0.1
Ledra-S. Maria	Italy	1	AT	0.1	5.6	504/504	1938	725	EW	0.1
Wildegg	Switzerland	1	AT	0.1	7.0	189/500	1938	750	EW	0.1
Bagnolo-Cremasco	Italy	1	AT	0.1	3.1	240/855	1937	1,125	EW	0.1
Osio Sotto	Italy	1	AT	0.1	3.2	340/280	1937	825	EW	0.1
Paderno	Italy	1	AT	0.0	2.5	275/855	1937	850	EW	0.0
Safrec	Italy	1	AT	0.1	3.2	340/875	1937	825	EW	0.1
San Osvaldo	Italy	1	AT	0.1	3.2	398/840	1937	725	EW	0.1
Souppes	France	1	ATW	0.2	1.2	51/750	1937	2,800	EW	0.2
Palazzolo	Italy	2	ATW	0.3	3.0	142,8/142,8	1936	2,025	EW	0.7
Udine	Italy	1	ATW	0.1	4.3	323/240	1936	900	EW	0.1
Borgounito	Italy	1	AT	0.1	4.4	369/1000	1935	825	EW	0.1
Cilavegna I	Italy	1	ATB	0.2	2.9	152/225	1933	1,800	EW	0.2
Cilavegna II	Italy	1	AT	0.2	2.9	152/155	1933	1,800	EW	0.2
Zwingen	Switzerland	2	ATB	0.2	4.2	140/750	1928	1,400	EW	0.3
Mandeur	Spain	2	ATB	0.1	2.6	130/500	1926	1,400	EW	0.2

AP	Tubular turbine with bevel gear
AR	Tubular turbine with belt drive
ACAT	Tubular CAT-turbine
AK	Vertical Kaplan turbine
AS	Splitturbine
AF	Open or pressure flume turbine, with or without step-up-gear
AT	S-type turbine, with or without step-up-gear
AI	Inclined tubular turbine, with or without step-up-gear
AV	Vertical tubular turbine, with or without step-up-gear
..B	runner regulated
..W	adjustable guide vanes only
..D	direct drive
..PG	planetary gear
..RA	belt drive
..SG	spur gear
..M	Modernization, spare runner or uprating